GAS JOURNAL

LIGHT ⁘ HEAT ⁘ POWER ⁘ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

PROPRIETORS: WALTER KING, LIMITED. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

Telephone: Central 6055. —— Telegrams: "GASKING, FLEET, LONDON."

VOL. CLXXXIII. No. 3403.] WEDNESDAY, AUGUST 8, 1928. [80TH YEAR.

Editorial Notes.

Coal.

In these days, when the working results of the collieries in all districts are published monthly in connection with the regulation of wages rates, even the most inveterate traducers of the owners find it difficult to maintain that immense profits are being made and secretly disbursed. In fact, the tune has changed, and these same traducers proclaim that the industry is rushing headlong to ruin, precipitated by the utter incompetence of those who direct it. The monthly ascertainments are worked in a form which really conveys little detailed information to the average lay mind, but it is generally recognized, except by the unthinking householder when he pays the account for his half-ton of domestic coal, that the industry is in a very bad way. It is now a good many years since the post-war boom came to an abrupt end; and an accumulation of bad times since then has not only exhausted reserves, but also taxed the credit of the industry to a point where it is difficult to raise money to carry on.

While we cannot attempt to compete with those who have a ready-made remedy, it would seem opportune to review some of the circumstances and happenings which have lately, in rather confusing manner, thrust the industry into the limelight. If we believe in the inexorability of economic facts, all the suggested cures of the trouble become mere palliatives. Even without the 200,000 mine workers who are now said to be permanently superfluous, we produce a huge surplus of coal which must be exported—upon the export of which, in fact, our national well-being is very largely dependent. In the world market there is available more coal than is required, owing to the post-war development of new fields, and to other sundry causes. If, then, other producers are able to offer coal at lower prices, quality for quality, than we can, whether it be by sweating their labour or by any other means, they obtain the trade, and we do not. And that is exactly what has been happening for some time. But the further we explore, the more complicated does the problem become. The great bulk of the cost of coal production is in wages. The miners have a good deal of sympathy in their claim that these, even when pits are working full time, provide a low standard of living; and it is generally recognized that there is much distress in the mining districts. The other obvious suggestion, which was made and carried by the owners as the outcome of the 1926 stoppage, was to cheapen costs by producing more coal by the same labour, or the same coal with less labour. Even so, we have not been able to produce cheaply enough to sell our full output, which, of course, *ipso facto* vitiates what is, in theory, an economically sound proposition.

As to when, why, and how this condition of affairs will end, we have noticed few predictions hazarded. Modern science is continually striving after more efficient utilization of fuel—in other words, making less of the raw material do more work—and the gas industry is in the forefront of this movement. Will civilization more than counterbalance this by its increased demand for concentrated energy? Or will it all end in somebody's mines going out of production? And if so, whose mines? In the meantime, let us consider briefly what is being done at present to tide our coal mines over these difficult times, or to help them to be the fittest, if it is to be a question of survival. Until the recent Government announcement concerning relief through railway rates, the so-called "Five Counties Scheme," embracing Yorkshire, Lancashire, and the Midlands, was the most prominent. This, as is well known, is an attempt to compete in the world market at the expense of the home consumer. It is granted that the districts concerned are fighting for their lives. After that, it is hard to say anything in favour of the scheme. It implies charging an uneconomic price to home industries, in order to give the foreigner cheap coal. It takes export trade away from Northumberland, which has practically no home consumers to squeeze, and from Durham, which is also fighting for its existence. Moreover, according to current accounts, the scheme is encountering many difficulties. In other districts—Wales, Northumberland, and Durham, for example—there are minimum price agreements among the various collieries, of a more or less binding nature; and to maintain these necessitates a restriction of output by short-time working. The view is widely held, we understand, in support of these arrangements that the shortage of available trade is such that no reduction of prices within reason would bring any appreciable increase—a striking testimony, from within the industry, to the seriousness of the situation. Then there have been recent meetings of the Mining Association, which at present stand adjourned, to consider the possibilities of evolving some marketing scheme for the whole country, which would necessarily, in present circumstances, involve restriction of output, and an agreed division of available trade among the various districts.

These are, so far, the attempts of the industry to help itself. Of political schemes, there is that certain cure of all evils—nationalization, which would rejoice the hearts of many coalowners, if they were paid even a pittance for the mines, but would be unlikely to increase by one ton the demand for coal. And then there is the new-born scheme of the Government to give early relief in the shape of subsidized railway rates, in much the same way as Poland has helped her mines to compete with ours ever since she was able to raise a loan last year on the London market. Effective comment on the new scheme must be deferred till further detail is known, but it has long been claimed by the owners that high railway rates are an excessive item of cost over which they have no control. The relief—rather to the disappointment, we are sorry to hear, of certain sections of the coal trade—is not to be a dole in any shape or form, but is to be passed on to certain specified trades, and to enable coal to be exported at lower prices. It is, presumably, another attempt to reduce costs by increased production, and to absorb miners who are at present unemployed through lack of trade. While the gas industry is not included among those who are to benefit

directly by the scheme, they will not grudge assistance to others who are in dire need of it. The proposals have already been much criticized in the sense that the relief obtained is unlikely to bridge over the present known loss per ton. But such criticism is hardly to the point. Let the scheme have a fair trial, to show whether an increased volume of trade is obtainable, with consequent cheapening of coal all round. It may yet prove to be a successful attempt to tide the unhappy coal industry over until still further relief is obtained from the general derating next year.

We end, as we began, by confessing that the situation, as we see it, is fraught with immense difficulties. From the viewpoint of the nation in general, and as a coal consuming industry in particular, we are so vitally interested in the fortunes and troubles of our coalfields that we consider it advisable from time to time to take such stock of the situation as we can, even if we can make no great contribution to its solution.

Workers in the Gas Industry.

As a means of livelihood, the gas industry has long been recognized as possessing important advantages over a number of others. Gas manufacture not being subjected to the ups and downs which trade cycles impose upon the majority of industries, the work is of a regular nature. It is well paid; and the conditions of employment are good. The prevalence of co-partnership in the gas industry is proof of the keenness of the administrators in furthering the welfare of the employees. This keenness acquires an added significance when comparison is made of the growth of co-partnership in the gas industry with its slow establishment elsewhere. It has been said, of course, that the gas industry lends itself in peculiar degree to the inauguration within its ranks of co-partnership schemes; but as often has it been denied that what the gas industry has done cannot be accomplished in other industries.

The possibility of getting into a co-partnership undertaking, then, is one advantage of selecting work in the gas industry as a means of livelihood; but, as already remarked, there are also others. The great holiday month is hardly an appropriate time to recommend the study of figures; but by delving into the Nineteenth Abstract of Labour Statistics of the United Kingdom (published by the Ministry of Labour), an idea of some of these other advantages may be gained. Still further information would be derivable, were it found possible on future occasions to separate, in respect of all details, the gas industry from electricity and water. This is the second issue of the abstract since the war; and in the serial tables the figures relate, as far as possible, to the years 1911-27. Thus there are reproduced for comparison statistics for three pre-war years. Wage conditions are only brought-down to 1924; but there is no reason to suppose that the advantageous relative position then held by the gas industry has since been lost. In that year the average weekly wages of 94,419 workpeople engaged in the gas industry were just over £3, which is well above the rates payable in the great majority of occupations listed, and is exceeded in but three or four instances. In the matter of the average normal weekly hours for the year named, the gas industry was somewhat higher than most, with 48½ hours. There were only 784 female workpeople; and the average weekly wage of these is given at a trifle below 30s. In each case these averages are based on four selected weeks. For the same year there are statistics relating to 19,886 shift-workers. Of these, 19,425 worked on the three-shift system, and only 427 on the two-shift and 34 on the four-shift systems. That is to say, 97·6 p.ct. were working on shifts of eight hours, and only 0·7 p.ct. on shifts of twelve hours. The percentage of shift-workers working seven shifts a week was 75·5, and six shifts 22·9.

At the end of 1927, there were 53 profit-sharing and co-partnership schemes in operation in connection with gas, water, and electric supply undertakings; and a note appended to the table points out that the concerns in this group are almost entirely gas companies. In these 53 schemes, approximately 41,900 employees were entitled to participate. The number of persons killed in accidents on gas-works in 1926 was 24—a figure which was largely exceeded in many other industries. A section of the abstract deals with strikes and lock-outs; but the statistics quoted are not divided up under the heads of the different industries. Even were this done, however, the results would be found to have little relation to the gas industry, which is yet another advantage possessed by that industry from the point of view of the worker who depends upon it for a livelihood.

Water Gas Manufacture To-Day.

It seems that water gas plant has in the past been to some extent the Cinderella of gas-making units. The more spectacular developments in high-temperature carbonization plants—horizontal, vertical, and intermittent—have had greater appeal to the imagination than has the evolution of the water gas machine from the crude gas producer of 1832 to the automatically-controlled plants of to-day, such as, for example, are installed at the Nine Elms Works of the Gas Light and Coke Company and at the Garston Works of the Liverpool Gas Company. The address by Mr. F. W. Steere, Vice-President of the Semet-Solvay Engineering Corporation, before the Canadian Gas Association at their annual convention at Hamilton, is therefore most welcome. It comes at a time when the industry, recollecting the yeoman service of "blow" and "run" gas during the coal strike of 1926—when no less than 65,309 million c.ft. of water gas was distributed in Great Britain and when several undertakings were supplying a gas consisting of 50 p.ct. water gas—not only has a sharpened appreciation of this service, but is beginning to question the notion that a therm of water gas is much more expensive to manufacture than a therm of coal gas. Regarding this, our readers will doubtless recollect Mr. R. E. Gibson's statement at the Cardiff Meeting of The Institution of Gas Engineers last June—that the cost of producing carburetted water gas at Garston is less than the cost of making coal gas.

To return to Mr. Steere's address, an extract from which is published in later pages of this issue, the author divides the evolution of the water gas machine into four stages. The first period is from 1834 to T. S. C. Lowe's invention of carburetting with oil in 1872; the second period is from the latter year to 1898, and was marked by the invention of the up and down run process; the third period is from 1898 to 1921, when the back-run system was brought out by D. T. Young, and when the sensible heat in the waste gases was harnessed; the fourth period dates from 1921 to the present time, and has been characterized by the rapid development of complete automatic control. Mr. Steere is obviously highly enthusiastic about the merits of the back-run process, and regards in a most favourable light the latest modification of this—the low-gravity back-run. As our readers are aware, the ordinary back-run consists of admitting the down-run steam at the top of the superheater, passing it down through the latter and up through the carburettor, and then conducting it—now in a highly superheated condition—down through the generator. With this system, carburetting is confined to the up-run, which may, in fact, result in decreased oil efficiency when large quantities of oil are being used. In the low-gravity back-run process, however, oil is sprayed into the top of the superheater during the back-run part of the cycle. The oil is cracked during its course through the machine, and—to quote Mr. Steere—"the carbon in the oil remains as fuel in the generator." Thereby, it is claimed, and doubtless with good reason, the capacity of the unit is increased, and there is greater control of the specific gravity of the resultant gas. No mention is made, however, of the influence of methane on the reactivity of the coke in the generator—an influence which must be extensive at temperatures *circa* 900° C.

For the back-run process in general, it is stated that the merits are better distribution of heat in the generators, increased output of the plant, increased oil efficiency, and reduction in coke used. Against these merits, though, must be placed the facts that the steam used during the back-run may be excessive, and that, the more the heat extracted from the carburettor and superheater, the less the heat available in the waste-heat boilers. It is really a

matter of robbing Peter to pay Paul, and hoping that the re-distribution of efficiencies will benefit the over-all commercial efficiency of the plant—which we think it does.

What of the future of carburetted water gas, produced either from coke or from bituminous coal, or from a mixture of both? We regard it as exceedingly bright. At present the thermal efficiency of a C.W.G. plant, due to the "blow" losses, does not compare favourably with that of a carbonizing plant; but the whole process is essentially in a state of evolution, and there is no question that carburetting efficiencies will be greatly enhanced in the future by closer attention to the design of carburettors, which at present are too small for what they are called upon to undertake. Mr. Steere points to the low initial investment necessary for water gas plants. Figures indicate, however, that the cost per million c.ft. of a modern automatically-controlled water gas unit, including subsidiary plant, is not greatly below that of a modern coal gas installation. The outstanding gain will be on the remarkably low labour costs and the low maintenance charges of the water gas machine, and its truly extraordinary flexibility. From the purely scientific aspect, there is a sense of satisfaction in a gas undertaking converting the thermal energy of a ton of coal into gaseous form, rather than transforming part of this energy into gas, and selling the bulk in a solid modification which, if money is not spent in its preparation, is not always acceptable, even to a long-suffering public. Of course, there are so many facets to the question that off-hand generalization is manifestly absurd; but, in terminating this reference to Mr. Steere's address, we would mention that two-thirds of the town gas used in the United States is carburetted water gas, and that its annual consumption by English-speaking peoples is 400,000 million c.ft.—which indicates that there is no justification for treating a C.W.G. plant as a Cinderella.

Welsbach Light Company and the "I.C.I."

Special interest attaches to the report of the meeting of the Welsbach Light Company which appears in our news columns to-day, on account of the fact that the Chairman's remarks were mainly in regard to an offer made by Imperial Chemical Industries, Ltd., to acquire the Welsbach Company's shares on the basis of one "I.C.I." fully paid ordinary share for every two Welsbach shares, and one "I.C.I." fully-paid deferred share for every twenty Welsbach shares. The offer is withdrawable after Aug. 14, if not then accepted by holders of 76 p.ct. of Welsbach shares; but at the time of the meeting the Chairman was able to announce that assents to the exchange had already been received from holders of over 67 p.ct. of the issued Welsbach shares. The offer is one which the Directors strongly advise the shareholders to accept.

Mainlaying in Piccadilly Circus.

Every gas undertaking has its distribution problems, but few can have had to face such an intricate situation as had the Gas Light and Coke Company in their mainlaying operations during the reconstruction of the Piccadilly Circus Station for the London Electric Railway. An illustration in our columns to-day gives a good idea of the network of pipes under what has been termed the "hub of the universe;" and Mr. H. J. Escreet, the Assistant Distributing Engineer to the Gas Light and Coke Company, describes how the mainlaying work of the Company was tackled, and how it is being brought to a successful conclusion. Welded steel pipes, 24 in. in diameter, have been used. The work has been continuous, night and day, and a large proportion of the trenches have been excavated at night and covered by day, so that traffic could pass over them. The difficulty of the problem has been increased by the shortness of the "night"—from 1 a.m. to 7 a.m.—and the fact that during this period concrete breakers cannot be used, owing to the noise they make.

Workers' Shares.

Under the proposed scheme of Imperial Chemical Industries for giving the employees a financial interest in the business, it is stated that all workers will be given the opportunity to purchase shares in the Company at 2s. 6d. below the mean market price, while those whose wages amount to £200 a year or less will be given one share free for every four purchased. The purchase also may be made by instalments; and if the worker should die before completing his payments, his shares will be paid up by the Company and passed fully paid to his next of kin.

The Government Electricity Scheme.

In the current issue of the "Financial Review of Reviews," Mr. E. T. Good criticizes the Government electricity scheme; and his article, entitled "Electricity and Gas," is a spirited one. Anything saved on generation, he says, by the scheme will probably be lost in the increased cost of distribution, and the idea that British farmers will get cheap electricity is "gross and wicked misrepresentation." Our agricultural districts are too thinly populated, and the farms, unlike those of the Continent, are too widely scattered for this to take place. Light and heat in the form of gas are far cheaper than in the form of electricity. "Why, then," he asks, "this bureaucratic State interference, semi-Socialistic scheme, designed to electrify the country and beat down the gas industry, without an atom of proof that manufacturers, farmers, or householders will obtain cheaper power, light, or heat?" "This is a big coal country," he continues, "and it is in our interests to stick to gas because the gas industry is an efficient coal consumer, and a producer of many things essential in peace and in war. . . . If the nation drops gas to take up electricity, it will lose a substance snatching at a shadow." Having mentioned the unreliability of electricity, he goes on to say that the exclusion of distribution from the scheme, or the control of the Commissioners and Board, has already resulted in a policy of concession hunting which can only be inimical to the best interest of the country as a whole. He concludes by remarking that the gas industry puts its pipes underground, and asking why electricity should be allowed to spoil the landscape.

The Users of the Roads.

Some idea of the importance of good road surfaces will be conveyed to the lay mind by figures quoted by Lord Montagu of Beaulieu in a letter to "The Times" on the subject of the Railway Companies' new road powers. There are, he says, in this country, in round numbers, nearly 1,500,000 privately-owned motor vehicles, of which two-thirds are cars and one-third motor-cycles. In addition, there are 500,000 commercial motor vehicles. In round figures, highway rates provide £31,000,000, or three-fifths of the £52,000,000 a year spent on roads, while motor taxation provides £21,000,000, or two-fifths.

PERSONAL.

Dr. R. LESSING, Ph.D., F.I.C., M.I.Chem.E., has been elected an honorary member of the Coke Oven Managers' Association.

OBITUARY.

Mr. WALTER ALKER, who died at his home at the Adlington Gas-Works on Aug. 1, had been Manager of the works for 45 years. He commenced in the mains department of the Wigan Gas Company, later transferring to the Blackrod Gas-Works, where he was Assistant Manager. In 1883 he came to Adlington as Manager, and thirteen years later was given the additional position of Secretary. One of his sons, Mr. Ernest Alker, is Assistant Manager at the Adlington Gas-Works, and the other, Mr. Walter Sydney Alker, is Manager of the Withnell Gas-Works.

Presentation to Apprentices at Watson House.—Tuesday, July 17, was a very interesting day for a large number of the apprentices in the Gas Sales Department of the Gas Light and Coke Company. On that afternoon the lecture room at Watson House was crowded with as many apprentices as could be accommodated there to welcome the Governor, and to listen to an interesting speech from him on the occasion of the presentation, for the first time, of the Silver Medal offered some time ago by the Worshipful Company of Turners for competition annually among certain of the apprentices under specified conditions. The Silver Medal was awarded to E. G. Hartley; and E. C. Kayes and D. Jones were presented with books by the Directors of the Company, who also presented Hartley with books to the value of £3.—From the "Co-Partners' Magazine" of the Gas Light and Coke Company.

THE LATE ARTHUR F. BEZANT.

THE FUNERAL.

A simple service in the little church at the Watling Street Cemetery, Dartford, on Friday, Aug. 3; the final words at the graveside; and the last sad rites are over. There is an atmosphere of unreality abroad. One has not had time to realize the full significance of what is taking place. It is the end to which everyone must come; yet all that it means is so difficult to grasp quickly. Even the parting reverent glance at the coffin, with its inscription—

ARTHUR FITZROY BEZANT,
Died July 31, 1928,
Aged 63 years,

fails to remove at once from the mind the deep impress that long custom has made upon it—the impress that Arthur Bezant is one of us.

Among those present are old and tried friends. Indeed, in one or another almost the whole working life of the one who has departed from us is represented. Those who had known him longest are here at the last. In addition to his only son, Mr. Bernard Bezant, and other representatives of the family, we meet Mr. John Terrace, President of The Institution of Gas Engineers, and Chief Engineer of the South Suburban Gas Company, of whose Dartford Works Mr. Bernard Bezant is in charge; and there is Mr. Walter T. Dunn, the Institution's Secretary. Mr. W. M. Mason, Manager of the British Commercial Gas Association, is here, and Mr. Arthur L. Griffith, Secretary of the Society of British Gas Industries. Another old and close friend is Mr. F. D. Marshall. And there are Mr. Charles Clare, of Radiation Limited; Mr. George Jackson, of the Woodall-Duckham Companies; and Mr. A. C. Hovey, of West's Gas Improvement Company. Mr. J. James, District Foreman at Dartford, is present to show his sympathy with Mr. Bernard Bezant. Messrs. Walter King, Ltd., are represented by the Chairman, Mr. Clifford A. King, and his co-Director, Mr. W. Rupert King, together with senior members of the staff who have spent most of their business years in the service of the "JOURNAL"—or, in other words, as colleagues of the late Editor.

Some friends who have been unable to attend or to be personally represented have despatched beautiful floral tributes. There are flowers from:

President and Members of the National Gas Council.
President, Members, and Council of The Institution of Gas Engineers.
President, Chairman, and Members of the British Commercial Gas Association.
Council and Members of the Society of British Gas Industries.
London and Southern District Junior Gas Association.
Governor and Directors of the Gas Light and Coke Company.
Staff of the South Suburban Gas Company, Dartford Works.
Chairman and Directors of the Wandsworth, Wimbledon, and Epsom District Gas Company.
Colleagues at Bolt Court.
Directors and Staff of the Chancery Lane Printing Works.
Mrs. Walter King and Family.
Sir Arthur Duckham and Directors of the Woodall-Duckham Companies.
Radiation Limited.
Dr. and Mrs. Adams.
Mr. and Mrs. Dyson.
Mr. and Mrs. Cameron Evans and Miss Eicke.
Mr. Bryan Laing and Mr. Harald Nielsen.
Dr. L. Miskin.
Mr. and Mrs. R. B. Swann.
Mr. John Terrace.

A. H.

REMINISCENT.

Indulgence in younger days, on the part of the writer, in the reprehensible practice—long since abandoned—of keeping a diary, makes possible the reproduction here of two entries which, though seemingly of small importance at the time, are now of interest. Most of these embodiments of indiscretion met in due course with the fate which they merited; but it so happens that the diary relating to the year 1886 (doubtless because it records events which were destined to exercise a greater influence upon two lives than even the ones germane to this note) was preserved, and lies open on the desk. The entries are in shorthand characters, so fine that, alas! a magnifying glass is now necessary to decipher them; but by this means they can be clearly read. Two of them are as follows:

1886.

Monday, Feb. 22.—Commenced work at Mr. King's. Went with Mr. Bezant to an Aerated Breadshop in Chancery Lane.

Tuesday, Feb. 23.—Half-holiday. Went with Mr. Bezant to the meeting of the Woking Gas and Water Company. Took down a short report of the proceedings.

Those were Spartan days, when hard work and self-denial were the ordinances laid down for young men; and the junior members of the "JOURNAL" Editorial Staff followed both. Their work was what journalism to such must always be; their self-denial is evidenced by the manner recorded above of spending a half-holiday—the first, too, which one of them had experienced in that service. It should, perhaps, be pointed out that the "JOURNAL" in those far-off days, and for many years subsequently, was published on Tuesday, which was therefore the slackest day for the Editorial Staff; Saturday was a full working day, which usually did not end with the closing of the office doors.

The training was strict and thorough; for the late Mr. Walter King was particular to a degree as to the manner in which work was done for him. At no time, however, did he ask others to do for him what he was unwilling to do himself; and he was almost invariably the first to arrive at, and the last to leave, the office. As an example of the thoroughness with which things were done, it may be pointed out that the correspondence was dictated to one of the two editorial assistants, who took it down in shorthand and then transcribed the notes, which were gone over by Mr. King himself, and afterwards fair-copied with pen and ink by the clerical staff.

This was forty and more years ago; but it was amid these surroundings that a close association was formed between two young men, which was to endure for so many years; and through such changing conditions. Though not permitted to gaze into the future, we are privileged to look back upon the past; and so it is that those who have gone remain with us. May remembrance of what is past give those who mourn strength to go on into the future.

Alfred Harrison.

APPRECIATIONS.

FROM the large number of letters of sympathy and appreciation which have been received, it has been possible to select only a few for publication. These, however, adequately express the sentiments of all our correspondents, to whom our gratitude is extended.

Sir David Milne-Watson, D.L.,

President of the National Gas Council and Governor of the Gas Light and Coke Company.

I was exceedingly sorry to learn of the death of our old friend Mr. Bezant. He was a valiant champion of the gas industry, and his life's work was devoted to furthering its interests. He was untiring in his efforts on its behalf, and possessed a unique knowledge of its ramifications, which he brought to bear upon its problems through the medium of the "GAS JOURNAL." He rendered to it invaluable service; and we shall greatly miss his ever-ready assistance, such as he rendered particularly during the important developments of recent years. His death will be keenly felt by his very large circle of friends throughout the industry.

I have the most pleasant recollections of Mr. Bezant during the many years that I have known him, and time has only increased my regard for him. I shall feel most deeply the absence of his genial figure from our many meetings.

Dr. Charles Carpenter,

Chairman of the Gas Companies' Protection Association, and President of the South Metropolitan Gas Company.

No two men were stauncher friends than Walter King and George Livesey, and both during their lifetime occupied exceptional positions in the industry they served so well.

As my career developed under Livesey, so did that of Arthur Bezant under King (Gas-king, as he was aptly designated by my friend Mr. F. Marshall).

His life was, like that of many other conscientious workers, passed mainly out of the glare of that limelight which illuminates the characters of the humanity it fascinates. Yet for many years, not only at every technical gathering or social function, but at most meetings of gas companies supplying London and its suburbs, Bezant was at work keenly absorbing not only general principles, but essential details of the progress and the policy of our industry.

Arising out of my long intercourse with and knowledge of him, I came to think with the late Sir Corbet Woodall that the obligation under which gas companies lay to him merited

recognition of a more substantial kind than that usually accorded to writers or technical journalists; and had not a course I laid down for myself been deflected by an obstruction, I might to-day have been mourning Arthur Bezant as a dear colleague as well as friend.

Be this as it may, there can be no uncertainty about the indebtedness of the shareholders in gas undertakings for his advocacy of their interests and his wise guidance in gas affairs.

At a critical period in the history of gas legislation he did not allow himself to be diverted by short-sighted pressure from less competent persons, for notwithstanding influential opposition thereto, he supported parliamentary procedure as the alternative to bureaucratic bargaining, advocating the adoption of the basic-price principle as providing the best solution of the post-war difficulties confronting gas administrators.

On behalf of the oldest (and only) association watching the interests of the gas-shareholding public in this country, I lay its tribute to the memory of one who had their welfare and their future ever in his mind.

John Terrace,

President of The Institution of Gas Engineers, and Chief Engineer of the South Suburban Gas Company.

The death of Mr. Bezant comes as a great blow to his many friends in The Institution of Gas Engineers, who, although they knew of his illness, did not anticipate that the end was so near. We shall all miss him very much, and it is difficult to realize that we shall not any more meet him on the many occasions when it was possible to have a quiet chat and handshake, and benefit by his kindly counsel. I have known him for over a quarter of a century, and have watched with interest his advancement in the journalistic world, and know he is a man who will be greatly missed.

F. W. Goodenough, C.B.E.,

Executive Chairman of the "B.C.G.A."

Others will speak—none can say too much—of the loss that the gas industry as a whole has suffered by the death of Arthur Bezant. It is my sad duty to say how great is the loss sustained by the British Commercial Gas Association; and no one can be more acutely conscious of that loss than the Chairman of its Executive, to whom for seventeen years he was a valued counsellor and friend. From the inception of the idea of co-operative work for the commercial development of the industry, right through all the stages of the evolution of the "B.C.G.A.," the brilliant journalist whose loss we mourn was its keen supporter, friendly critic, and wise counsellor. With the insight and foresight which were his in unusual measure, he saw the ever-growing need of the gas industry for enterprise and efficiency on its selling and service side, recognizing always that service is the essential foundation of permanently successful selling; and he put his whole strength into advocacy of whatever he believed was designed and destined to advance the commercial efficacy of the great industry to which his life was devoted. An outstanding instance of this was his enthusiastic and indefatigable support of the Gas Salesmen's Circles from the first day on which the idea was discussed with him—support that quickly bore fruit in the establishment by the "GAS JOURNAL" of the "Gas Salesman" Supplement, whose value needs no emphasis to the "JOURNAL'S" readers. Every member of those Circles, as every member of the Association, mourns a stalwart advocate and helper; everyone who knew him personally a genial, courteous, keenly interested colleague—for he was essentially "one of us"; those who, like the writer, were favoured with his confidence and his friendship, mourn one of the best and truest friends, and carry sad hearts to think they will never again grasp his hand and be cheered by his warmhearted smile.

R. J. Milbourne, J.P.,

Chairman of the Society of British Gas Industries.

It is with feelings of deep regret that I read of the somewhat sudden and unexpected death of the Editor of the "Gas JOURNAL." Those members of the Society of British Gas Industries who knew Arthur Bezant intimately, and many more whose knowledge of him was perhaps less intimate, must realize the immense amount of good work he did on behalf of our Society and the gas industry generally. It was undoubtedly due to his initiative that the Society was successfully brought into existence, and I desire to express on behalf of the Council and members our deep sense of the invaluable services which he rendered to the gas industry during the many years he has been associated with the "GAS JOURNAL," and we wish to place on record our high appreciation of his very great helpfulness, his constant courtesy, his patient consideration of all matters affecting the welfare of the gas industry, and his anxiety to be of assistance at all times. He was a noble example of what may be accomplished by indomitable perseverance, industry, and thorough confidence in one's own ability. He was constitutionally a happy man, happy in his work; and there would seem no doubt that the strain of work had taken a greater toll than he or anyone else realized.

In the death of Arthur Bezant, another of those landmarks which connect the present with the past has been removed; and every member of the Society of British Gas Industries mourns the loss of a very dear and intimate friend, whom we shall always remember with real affection, and one to whom the whole industry owes a great debt of gratitude.

On behalf of the Council and members of the Society of British Gas Industries, I wish to express our deepest sympathy with the widow and her son on the sad and irreparable loss they have sustained.

H. D. Madden,

Late President of The Institution of Gas Engineers.

It is with extreme sorrow that I learn to-day from the "JOURNAL" of the passing-away of my very old friend, Mr. Bezant; and I feel I must write and say how much I sympathize with you in the loss of such a colleague. His death is a distinct loss to the industry—his timely utterances in the "JOURNAL," and his constructive criticism have been of immense value over a very long period; and the industry is the poorer by his death. For my own part, he has been a real friend; and I have valued exceedingly his help and guidance on very many occasions.

Walter T. Dunn,

Secretary of The Institution of Gas Engineers.

I knew Arthur F. Bezant ever since my great adventure in accepting the then somewhat insignificant position of Secretary of The Institution of Gas Engineers, to which I was appointed just before the opening of the annual meeting in 1896, held in London under the Presidency of the late Mr. W. R. Chester, Engineer and General Manager to the Gas Committee of the Nottingham Corporation. That is now over 32 years ago. Naturally my duties brought me frequently into intimate contact with my esteemed friend Mr. Bezant. For his memory I shall always cherish an affectionate regard. He was a friend in the truest sense of the word, and often helped me when our printers could not deal with the great pressure of Institution work near the time of the annual meeting. He will be sorely missed by the gas industry, so diverse and excellent were his many qualifications.

R. W. Edwards,

Vice-Chairman of the Gas Companies' Protection Association.

I have read with very great regret your notice in the last issue of the "GAS JOURNAL" of the passing of Mr. Arthur F. Bezant, whose work I had always admired, and whose personality I found extremely charming. I should like to confirm the feeling expressed in your columns last week, that the industry has experienced a severe loss. Mr. Bezant was not only a fearless critic but a very able exponent of the aims and objects of our great industry, and kept himself and your valuable journal well abreast of the times.

R. B. Hodgson,

Late Chairman of the Society of British Gas Industries.

I hasten to convey to you and your colleagues my sympathy in the loss you have sustained in the death of our friend, who was not only a very able and successful Editor, but one who was loved and respected by the whole gas fraternity. His loss as Editor and journalist will be felt by all who had to deal with him in this capacity.

Speaking as a contractor, I always found him most willing to propagate any information which was of value to the industry; and I shall not forget the help and assistance he readily gave me when I was preparing my Address for the Society of British Gas Industries last year. I wish, therefore, to pay my tribute to one whom I am sure all members of the gas industry respected, and at all times looked to for help and guidance. Mr. Bezant was a man of wide knowledge and experience, capable and efficient, and his place in the Technical Press, as far as gas is concerned, will be difficult to fill. All contractors and engineers are the poorer by his passing.

F. S. Cripps.

I was surprised and grieved to read the announcement in the "GAS JOURNAL," yesterday, of Mr. Bezant's death. Mr. Bezant apparently joined the staff about twelve months before I sent my first contribution to the pages of the "JOURNAL," in 1879—49 years ago. At that time Mr. Walter King, whom I have always regarded as one of my best friends, conducted the paper. He made it the highest standard of gas periodical in the world; and since his decease it has been well maintained, doubtless due in large measure to Mr. Bezant, whose loss we now deplore.

William Cranfield,

Editor of "Gas."

I must send a few lines to associate myself with you in a sense of the great loss that Mr. Bezant's death is to you and the whole industry. I had known him for 24 years, and ever found him the soul of honour, kindliness, and generosity of spirit. I feel I have lost a real friend. To the "JOURNAL" his loss must be incalculable, both for what he did and what he was, personally and in the estimation of the industry as representing the "JOURNAL."

ON THE ELECTRICAL SIDE.

Supply in Rural Areas.

In the early part of 1927, the Electricity Commissioners decided to undertake a general review of the question of rural electrification in Great Britain. This is a subject which has come into special prominence since the passing of the Electricity (Supply) Act, 1926, owing to the increased facilities for transmitting supplies over wide areas that will result from the carrying out of regional schemes by the Central Electricity Board under that Act, and to the enhanced prospects of supplies becoming available for the establishment of new distribution centres in areas where there is a reasonable demand for electricity. A conference was convened last November, which was presided over by Sir Harry Howard, the Vice-Chairman of the Commissioners; and after six months' investigation of certain aspects of the question, this Conference has prepared a report which has now been published. Two Sub-Committees were appointed—one to consider the nature and extent of the potential demand for electricity in rural areas, and the other to discuss the bearing and general effect upon rural development of the price of supply and the cost of electrical equipment.

Potential Demand.

Statistics are given by the first Sub-Committee of a number of farms in the country and the machinery at present in use; and the conclusion is drawn that, when electrical equipment of ordinary character is installed for farm purposes, and reasonably full use is made of electricity both for farming and farmhouse purposes, individual farms of the types in question are likely to represent, on a conservative basis, potential consumers to the extent of from 4000 to 14,000 units per annum. It is, they say, evident that, for economic reasons, rural electrification cannot be proceeded with to the extent of placing a supply of electricity at the service of every inhabitant, farm, and other premises, throughout rural Britain. Prospects in the sparsest and most remote areas are such as to delay for many years to come the establishment of a public supply on a remunerative basis, even under the most favourable conditions; and it has been variously estimated that up to 50 p.ct. of the more sparsely populated rural portions of the country is likely to fall within this category. The prospects in other areas are much more encouraging, and likely to justify the extension of an electrical service. The broad conclusion which is arrived at by the Sub-Committee is that a potential demand growing to the order of 230 million units of electricity per annum in the course of the next ten years is indicated for the rural areas in Great Britain where supply powers already exist. They are, however, careful to add that this figure can only be regarded as of a tentative character, and will be affected by a variety of factors which may stimulate, or militate against, the general adoption of electricity in rural areas. Realizing the important part which overhead lines and wayleaves must play in the rural electrification of Great Britain, the Sub-Committee draw attention to the advantages which will accrue from close co-operation in such matters between undertakers engaged in this class of development and landowners and farmers generally. One of their recommendations is that the Commissioners be asked to undertake within the next two years a review of their new Code of Overhead Line Regulations, with the view of effecting further reductions in the cost of rural lines, and to consider the practicability of providing for different classes of construction for different types of rural area.

Financial Considerations.

The second Sub-Committee, appointed to consider prices of electricity and cost of equipment, state that figures available regarding the actual expenditure on transmission, sub-stations, and distribution in rural areas which have been partially developed, and for the estimated costs of developing certain large areas up to the commercial limit of electrification, indicate that amounts ranging from £2 10s. to £4 per head of total population of the areas concerned are involved—representing the equivalent of from £600 to £1000 per square mile of area. These estimates based upon the probable commercial limit of development do not contemplate that an electrical service would be available for the whole of the population in the areas concerned. That big sums are at stake is obvious, for the Committee point out that a capital expenditure of the order of from £17,000,000 to £28,000,000 is indicated, if it be assumed that an electrical service, not necessarily for the whole of the population, could be made available within the limits of cost just mentioned in the existing rural distribution areas in England and Wales, which cover about 27,800 square miles. The urgency of the wayleave problem is recognized; and the suggestion is offered that a standard form of wayleave agreement would be advisable.

Limits of Price.

The views of the Sub-Committee as to limits of price for different classes of supply are set forth in detail; but it is added that the main prospects of securing the general use of electricity in rural areas depend upon the offer of an attractive two-part or "all-in" tariff. The financing of wiring and equipment costs is a matter which will require serious attention. The Sub-Committee recommend that the Commissioners be asked to urge upon supply authorities the desirability of greater uniformity in respect of methods of charge. Also that the Commissioners be asked to invite the assistance of the principal representative associations of the electrical industry in devising a practical financial scheme for ensuring that facilities in the way of assisted wiring and for the hire or hire-purchase of apparatus are available, wherever needed, to prospective consumers in rural areas of supply.

FORTHCOMING ENGAGEMENTS.

[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

Aug. 14-15.—IRISH ASSOCIATION OF GAS MANAGERS.—Annual conference in Belfast.

Sept. 5-7.—NORTH BRITISH ASSOCIATION OF GAS MANAGERS.—Annual general meeting in Edinburgh.

Sept. 19.—BRITISH COMMERCIAL GAS ASSOCIATION.—Meetings of the Executive and General Committees, in London.

Oct. 22-24.—BRITISH COMMERCIAL GAS ASSOCIATION.—Annual Conference at York.

THE INSTITUTION OF GAS ENGINEERS.

All meetings take place in the Council Room at 28, Grosvenor Gardens, unless otherwise stated.

Sept. 10.—Emergency and Finance Committees and Benevolent Fund Committee of Management in the morning; Council meeting in the afternoon.

Oct. 8.—Emergency and Finance Committees in the morning; Council meeting in the afternoon.

Oct. 9.—Gas Education Committee.

Nov. 12.—Emergency and Finance Committees in the morning; Council meeting in the afternoon.

Nov. 13.—Executive Committee of Gas Education Committee.

Dec. 10.—Emergency and Finance Committees in the morning; Council meeting in the afternoon.

Dec. 11.—Executive Committee of Gas Education Committee.

Association of Public Lighting Engineers.—The next Annual Meeting and Conference of the Association will be held at Bournemouth in September, 1929. The exact date will be announced later.

Industrial Salesmen's Circle.—Arrangements are being completed for a meeting of the Industrial Salesmen's Circle at Oxford on Friday, Sept. 28, when—through the kind co-operation of the Oxford Gaslight and Coke Company—a programme of outstanding interest is being arranged. It is hoped that time will permit of visits to the Cowley Works of Morris Motors, Ltd., and the adjacent steel press works, and to the Osberton Radiator Works, which are a branch of Morris Motors, Ltd. An item of special interest in the programme will be an address by a representative of Morris Motors, Ltd., who will deal with the application of gas for industrial purposes from the manufacturer's point of view.

Advantages of Refrigeration.—In a paper entitled "Clean Kitchen Management: The Preservation of Food," presented before the Personal and Domestic Hygiene Section of the Royal Sanitary Institute Congress at Plymouth, Mrs. M. A. Cloudesley Brereton said: "While I look for an extension of the use of refrigerators in the homes of the future, I can see definite signs of their adoption by the retailer—large or small. It is evident from what is everywhere going on that the trader will be convinced by the practical commercial advantages of refrigeration, and that he will not be obliged to steel himself to philanthropic action. I can quote one typical example—that of a firm controlling a large chain of stores all over the United Kingdom. Before refrigeration was available, there was the greatest difficulty in each depôt in finding the coolest spot to keep food overnight or during the week-end. This spot was usually on the floor in some corner where there was a draught. It may be supposed that this was scarcely hygienic. Even then there was a great risk of spoiling. Now, when each depôt has its refrigerator, the actual saving in money, from the sale of foodstuffs which previously would have gone bad, is considerable. It is worth remembering that the average shop temperature, as early in the year as May, is 62° Fahr., and the temperature in an efficient refrigerating cabinet is normally about 35° Fahr."

INDUSTRIAL CO-PARTNERSHIP CONFERENCE AT OXFORD.

Sir David Milne-Watson's Address.

(A full report will appear next week.)

SOME OF THOSE WHO PARTICIPATED IN THE CONFERENCE.

Sir David Milne-Watson, the Governor of the Gas Light and Coke Company, speaking at the Industrial Co-Partnership Conference at Oxford, which was held from July 27 to 30, said he had never pretended that co-partnership was a panacea for the present industrial troubles. They were too deep-seated and diverse to be cured by any one remedy.

On the personal feeling between employers and employed, Sir David observed that to-day it was not possible for the principal of a big business to know all his workmen by name, but it was essential that the family spirit in business should be kept alive. The ideal was that the company should be regarded as a large family, wherein all the interests were the same. He believed that co-partnership was the vehicle by which the family spirit could be attained. The Gas Light and Coke Company had centred around co-partnership many other schemes, such as a pension fund, benefit schemes, and sports associations; and together they had brought back a friendly spirit.

One of the objections commonly taken to co-partnership was was that it made trade unionists disloyal to their union. That had never been found to be an objection in the case of the Gas Light and Coke Company. He had never asked a man whether he was a trade unionist; and no head of a department was authorized to put that question. Moreover, it was felt that it was between organized labour and organized employers that co-operation in industry could best be promoted. A man who was in a co-partnership scheme was less willing to be led into a strike without careful consideration, and co-partnership often supplied the machinery for settling disputes.

SHOWROOM ENTERPRISE.

Novel Displays of Cooking and Heating Equipment.

Noteworthy efforts are being made by the gas industry to make known to the public the latest developments in domestic cooking and heating equipment. As our readers are aware, several additions have lately been made to the handsome district showrooms of the large London gas undertakings; and those at Kensington, Kilburn, and elsewhere are remarkable not alone for the extensive range of modern appliances they contain, but also for their architectural features.

Not only in the Metropolitan area is this go-ahead spirit revealing itself. Some of the provincial undertakings are displaying much ingenuity in demonstrating the merits of gas apparatus, and there is at least one instance of a northern undertaking organizing a service of mobile showrooms, in the shape of convertible motor vans, in order to bring its products and supplies to the notice of its consumers in outlying parts.

The window space of the showrooms of the British Gas Light Company at Norwich is at present devoted to a new hot water system specially designed for smaller homes. The appliance shown is the "Regulo" controlled "Sunhot" boiler, recently produced by John Wright & Co. (Radiation Ltd., Proprietors), which is seen connected up by pipes to the bath, bathroom washing basin, kitchen sink, and a bedroom wash-basin, thereby illustrating how a continuous hot water service for the whole house can be supplied at a low gas consumption entailing a small cost within reach of any household.

CARBONIZATION TESTS ON "KINNEIL GAS" COAL.

Report of Fuel Research Board.

There has been published by H.M. Stationery Office, Adastral House, Kingsway, W.C. 2, at 1s. 6d. net, Fuel Research Physical and Chemical Survey of the National Coal Resources No. 11. This is an account of the Fuel Research Board's high-temperature carbonization tests of "Kinneil Gas" coal in continuous vertical and in horizontal retorts, which work was carried out under the supervision of Capt. J. Fraser Shaw, Chief Engineer, and Dr. J. G. King, Chief Chemist, at the Fuel Research Station. The coal was also subjected to low-temperature carbonization in the setting of Fuel Research Station continuous retorts; and the various cokes were tested for steam-raising purposes in a Lancashire boiler, and for fuel-gas production in three types of gas plant.

With regard to the high-temperature carbonization tests, 500 tons of the coal were treated. "Kinneil Gas" coal consists of the entire product of the six-foot seam as worked at the Kinneil Colliery of the Kinneil Cannel and Coking Coal Company, Ltd., Linlithgowshire. The coal received was the average output of the colliery, freed as far as possible from fragments of associated dirt partings, and from slack, by screening over 1½-in. round holes. The seam includes several distinct bands of shale, &c.; and a visual examination of the consignment showed that a fair proportion of these still remained in the coal. The average ash content of the consignment was 7 p.ct.; and it is shown that, after crushing, efficient cleaning should easily reduce this to about 4 p.ct. The analysis of the coal is given in the report, and its behaviour in the Gray-King carbonization assay apparatus described. In the latter it yields a hard compact coke, and it is indicated that a high yield of tar would be obtained in large-scale practice.

The carbonizing tests were undertaken in the Research Station setting of continuous vertical retorts (Glover-West) and in a setting of horizontal retorts recently installed for experimental purposes. Steaming experiments were carried out in the vertical retorts, the amount of steam being limited to 10 p.ct., as this gave a gas of a calorific value approaching the minimum used in the gas industry. In addition, a test was carried out at a higher throughput, as the coal was found very suitable for this type of retort, and superior in this respect to coal of high caking power. The higher throughput gave an increased output of therms of gas from the setting (22·8 p.ct.) but at a slight decrease in the yield per ton (5·2 p.ct.).

In the horizontal retorts, a preliminary series of tests was carried out in order to determine the most suitable conditions of working before commencing the "standard" test. The coal was crushed to pass a 1¼-in. screen, and the setting was heated by gas from the built-in producer. The charge per retort in the first three tests was 11 cwt., and the carbonizing period 9, 10, and 11 hours respectively. The best results were obtained in the fourth test, in which the charge per retort was 11·5 cwt. and the carbonizing period 11 hours 4 minutes. These conditions gave just the rated throughput of the setting (10 tons per day), and were therefore adopted for the "standard" test in which water gas from an external supply was used. The coal worked very well in these retorts also, and produced a hard compact coke containing only slightly more breeze than the best type of English gas coal.

The yields of products from the two types of retort are compared in the following table, together with similar results from "Mitchell Main Gas" coal:

—	"Kinneil Gas" Coal.		"Mitchell Main Gas" Coal.
Setting	Vertical Retorts.	Horizontal Retorts, Using Producer.*	Vertical Retorts.
Steam, P.Ct.	5·2	*Nil.*	5·1
Yields per ton of coal—			
Coke, cwt.	12·61	13·78†	13·88
Gas c.ft.	16,770	12,300	16,430
Gas B.Th.U. per c.ft.	477	574	517
Gas therms	80·0	70·6	84·9
Tar, galls.	15·0	9·4	11·6
Ammonium sulphate, lbs.	23·4	26·6	19·2

* 11·5 cwt. charges at 11 hours 4 minutes carbonizing period.
† Including 3·74 cwt. used in producer.

The general conclusion from the experiments carried out in the Fuel Research Station low-temperature plant is that the coal is a very suitable one for carbonization at 625° C. From these retorts a satisfactory smokeless fuel is obtainable from this coal, together with yields of tar and gas above the average. The gas volume would normally be that corresponding to a calorific value of about 750 B.Th.U.

Coke made by either high or low temperature carbonization of Kinneil coal, it is stated, is suitable for firing a Lancashire boiler, and for use in a suction gas plant. (The latter was a Ruston-Hornsby "Stockport" plant.) In the Research Station water gas plant (a Humphreys & Glasgow generator) results were by no means so favourable. The cycle in operation at the time Kinneil coke was first charged was 1½ minutes' blow and 4 minutes' run; the waste-heat boiler being in operation. In a very short time serious trouble arose owing to excessive clinkering. The use of a longer blow to assist in running-down the clinker only made matters worse, and eventually, owing to the demands of the Station (there being only one water-gas plant), the use of this coke had to be discontinued. The fusion point of the ash of the coal is above 1450° C. in an oxidizing and above 1350° C. in a reducing atmosphere. It would appear from the foregoing experience that the softening-point must be fairly closely defined, and that the temperature of the generator must have just reached the critical point on the 1½-4 minutes' cycle. It is probable, therefore, that further experiments with a cycle likely to give a lower working temperature would have determined conditions under which Kinneil coke would work satisfactorily, though the gas might perhaps have a rather low calorific value.

EVOLUTION OF THE WATER GAS MACHINE.

By F. W. Steere, Vice-President, Semet-Solvay Engineering Corporation.

[From an Address before the Canadian Gas Association, at their Annual Convention at Hamilton, Ontario, on June 21.]

The water gas machine is a modification of the gas producer. Our first record of the latter was in 1832. The development of the water gas machine from the gas producer was natural and logical, for producer gas contains all the nitrogen of the air used for blasting, resulting in a gas of low thermal value. It was a logical step to attempt the production of a higher B.Th.U. gas by eliminating the nitrogen, leaving the carbon monoxide and hydrogen.

As the water gas reactions take place at temperatures above 1832° Fahr., it was also natural that some one should think of blasting the fuel bed until it reached incandescence, and then shut off the air and make a gas run by admitting the steam alone. This was done by Ibbetson in 1834, and is our first record of the simple water gas process.

Water gas was made during the Civil War, and was used in observation balloons by the Army of the Potomac, but it was many years after this before this process was recognized as a possible source of gas for distribution by utilities. During the period of intensive oil development in the early 70's, Thaddeus S. C. Lowe conceived the idea of utilizing the sensible heat of the water gas in chequer-brick chambers—carburettor and superheater—for cracking oil and enriching the water gas with the oil gas so made. This was the beginning of the carburetted water gas process. The process was extremely crude, and the consumption of both oil and generator fuel was very high, but the equipment was extremely simple, low in first cost, and proved to be very useful as stand-by plant and in taking peak loads from the coal gas unit.

No basic improvements were made in the process until about 1898, when the up and down run feature was developed, and it became possible to introduce oil into the carburettor during both the up and the down run parts of the gas-making cycle.

No further basic improvements in the water gas machine were made until the invention of the so-called back-run by Daniel J. Young in 1921. The improvements during this long period consisted of mechanical refinements and in more accurately balancing the designs of the different parts of the machine, enlarging the connections, and increasing the capacity by reducing the time lost in changing the valves.

Four Stages of Development.

The historian's method of describing the evolution of the water gas machine would be to divide its development into periods. The first period would date from the invention of the water gas process, in 1834, to Lowe's invention of carburetting with oil, in 1872. The first period then covers the development of the simple water gas process. The second period would date from the invention of the carburetted water gas process, in 1872, to the invention of the up and down run process, in 1898.

This period could be thought of as the era of cheap oil and crude, inexpensive equipment. The third period would extend from 1898, with the invention of the up and down run, to 1921, the invention of the back-run process. The fourth and latest period of the development of the water gas machine, which can be thought of as the back-run period, dates from 1921 up to the present time.

No provision had been made in the early stages of development for the recovery of the sensible heat of the blast and waste gases. One of the important developments of this period was the waste-heat boiler, with which high-pressure steam could be generated in sufficient quantities to make the water gas machine practically independent of any outside steam supply. This steam was made by utilizing heat which was completely wasted in machines not equipped with waste-heat boilers. During the third period, many mechanical improvements were also brought out, such as the substitution of hydraulic operation for hand operation, and concentrating the controls at one point, to conserve time in their manipulation.

Though these improvements did not in any way affect the basic principles of the operation, they did serve to increase the over-all thermal efficiency of the water gas machine to a point where the water gas process became an important factor in the gas industry. Many cities were supplied with water gas exclusively. This was particularly true of some of the larger cities where, due to congestion, the high cost of real estate, and a questionable coke market, water gas could be made more advantageously than coal gas.

It is evident that much more progress has been made in the seven years of the fourth period than was made during any previous period. At the opening of this period, it was generally conceded that coal gas could be made much more cheaply than water gas with the prevailing markets for coke at that time. Also, there was considerable uncertainty as to the price and availability of oil for the future. The outstanding development of this period was the so-called back-run process.

The Back-Run Process.

Back-run gas is made by a process involving the use of superheated steam passed in the reverse direction through a water gas machine, the so-called back-run being substituted for the ordinary down run. The back-run steam is admitted at the top of the superheater, passes down through the superheater, up through the carburettor, and into the top of the generator. The steam, because of this treatment, becomes superheated to the temperature existing at the top of the carburettor. This highly superheated steam now passes down through the generator. The resulting gas is taken directly from the base of the generator through the back-run pipe to the wash-box.

Back-run gas is also made by leaving the back-run steam connection in the top of the generator and passing the steam down through the generator and out through the base of the generator directly to the wash box. When this part of the back-run process only is practised, the benefits resulting from the highly superheated steam are not realized, nor are the further benefits of the scurfing of the chequer-brick by the reverse action of the steam through the superheater and carburettor. This method of operation does, however, result in an increased efficiency of the machine, because of the gases during the back-run leaving the base of the generator at temperatures considerably below the temperatures in the carburettor and the superheater.

The outstanding advantage which results from back-run gas is an increase in the thermal efficiency of the water gas machine. This follows from the fact that the temperatures at the top of the superheater are lowered, as the upper part of the superheater acts as a regenerator. The blast gases leave the machine at a lower temperature, and the gases made during the up run also leave the machine at a lower temperature.

The back-run gas, which is formed by admitting the steam to the top of the superheater, picks up the heat in the upper courses of chequer-brick in the superheater, and carries it back into the generator. This back-run gas leaves the bottom of the generator at from 200° to 500° Fahr., depending on the amount of clinker in the base of the generator, and somewhat on the operating cycle.

Also the back-run steam, in passing down through the superheater and up through the carburettor, is superheated to the temperature of the top of the carburettor before entering the generator. Therefore all the back-run gas is made with highly superheated steam. This is one of the outstanding advantages of the back-run process, especially so when soft coal is used as generator fuel.

The net result of the lowering of the temperature of all of the gases leaving the machine is to give a higher thermal efficiency than is theoretically possible with a water gas machine not equipped to make back-run gas. This high thermal efficiency is immediately reflected in a saving of both generator fuel and oil. The generator fuel is decreased by the amount of the sensible heat regained. Oil is saved because of better temperature conditions throughout the machine, and because the chequer-brick can be kept clean over a longer period.

Employing Bituminous Coal.

In the earlier days of water gas development, anthracite coal was used as a generator fuel. Later, this was largely replaced by coke. The cost of either anthracite coal or coke is more than the cost of bituminous coal. It is obvious, then, that a material reduction in the cost of gas could be obtained if soft coal could be substituted for the hard fuel. With the many improvements that have been made in the water gas process, soft coal can now be used with entire success. Many factors have contributed to this very important development; and the many plants which are now running exclusively on soft coal, which previously ran on coke, constitute the best evidence of the success of this development.

Another important item of expense in the cost of making water gas is the process steam. It has now been completely proved that exhaust steam can be substituted for live steam for water gas making. The air blower is the largest single user of power in the water gas unit, but when the blower is being run there is no demand for process steam. The development of the steam accumulator has solved this problem by making the exhaust steam not only from the blower, but from the other auxiliaries of the plant available whenever required. This practically eliminates the cost of process steam as compared with the previous method of operation.

One of the most interesting and ingenious developments has been the automatic controls or "runners" that have been brought out for eliminating hand manipulation of the valves. It is now possible to operate a water gas machine with absolutely no hand manipulation. These controls have been perfected to a point where they will care for almost any emergency, and by the elimination of labour tend further to decrease the cost of the gas made.

The problems of charging the fuel into a water gas machine presented serious difficulties because of the temperatures and pressures in the top of the generator. These problems were purely mechanical, and the charging machines now on the market are working with complete satisfaction, and not only spread the fuel as it enters the generator, but accurately weigh the fuel charged. The charging machine still further eliminates hand labour and increases the capacity of the machine, not only because of the more uniform fuel bed conditions, but because the machine is not shut down for fuelling, as was the previous practice.

For many years extensive experiments have been carried on in the development of a device for automatically and continuously removing the ash and clinker formed in the water gas machine. From a mechanical standpoint, this is much the most difficult problem of the whole development. This problem, though the most difficult and the last to be solved, seems to be passing out of the experimental and into the commercial stage. With the perfection of mechanical clinkering, the water gas process becomes fully automatic and continuous, for the fuel is charged without stopping the machine, and the ash and clinker are removed mechanically and automatically. This is a further and very important step in reducing the cost of water gas, for the elimination of the labour of clinkering is a very important item.

The elimination of side wall clinkers, which is really a part of continuous clinkering, has been attacked in many ways; and we now have available means for preventing the formation of side wall clinker, thereby saving the expense and exhausting labour which were necessary in its removal.

The problem of the more efficient use of oil for carburation has received much attention. This problem is seriously complicated by the lack of uniformity in the oils available; but the records show that the oil efficiencies now being maintained on modern plants are much higher than were previously obtained, due to the better knowledge of chequering the carburettor and superheater, and more efficiently designed oil sprays.

Low-Gravity Back-Run Process.

Though the water gas machine can be quickly started and shut down on a moment's notice, and has a wide range of flexibility, this flexibility has been very greatly increased by the development of the so-called low-gravity back-run water gas process. This consists simply in spraying the oil into the top of the superheater during the back-run part of the cycle. This oil is cracked during its course back through the machine. The carbon in the oil remains as fuel in the generator. The hydrogen formed by this cracking process increases the volume of gas made during the back-run in proportion to the amount of oil added. The capacity of the machine can therefore be increased to the extent of the oil added during the back-run cycle. As the specific gravity of water gas is controlled by the hydrogen content, this increased capacity is due to the addition of hydrogen by the cracking of the oil in the generator. The gas so made is much higher in hydrogen content, and therefore of a lower specific gravity. The lower specific gravity is an additional advantage during peak loads, as it tends to relieve the distribution system during the time of greatest demand.

The low-gravity back-run water gas process is a new development; and there is not enough accumulated experience to state definitely that the process is going to be useful for anything more than peak load demands. This in itself is extremely important. If it is found that it can be run continuously and still maintain reasonable economy, it will solve the problem of varying gravities when coal gas and water gas are mixed in varying quantities. This development tends to keep the initial

investment in plant at the minimum, which is another important step in the reduction of the cost of water gas.

Solving the Effluents Problem.

There is a growing tendency everywhere to prevent the contamination of streams by pollution from industrial plants. Gas companies have been given credit for this offence quite out of proportion to the facts. Though the question of the elimination of phenols and tar acids in the coal gas process has not been entirely solved, the problem of the disposal of effluent from the water gas machine has been completely solved by using this effluent directly in the top of the superheater during the back-run cycle in place of process steam. This effluent, consisting mostly of water, is flashed into steam in the top of the superheater, and passes back through the machine as process steam. On installations where waste-heat boilers are used, the effectiveness of the waste-heat boiler will be reduced correspondingly. On installations not equipped with a waste-heat boiler, the use of effluent or water in the top of the superheater eliminates one-half the process steam. This is not an important economy where exhaust steam is being used, but it is a very important economy where steam is used or where the plant is so located that the disposal of the effluent from the plant is difficult.

In general, this outlines the major improvements in the water gas machine, which now promises seriously to affect the future trend of gas-works construction.

The thermal efficiency of the early water gas machine was very low. The thermal efficiency of the modern water gas machine closely approaches that of the modern coal gas process. The latter is inseparably bound up with, and dependent upon, the market for its principal bye-product, coke. The water gas process has no bye-products other than tar.

The cost of the water gas plant is approximately one-half the cost of a coal gas plant.

The water gas process, with the new developments for making peak load gas of low gravity, has a flexibility very greatly in excess of anything that can be even approached by a coal gas installation. This will be an increasingly important factor as the gas business is extended into the fields of domestic and industrial heating—which now appear most attractive.

The whole water gas situation can be briefly summed up as follows:

The thermal efficiency of the process has been brought to a commercial and competitive position with coal gas.

The mechanical problems have been solved, or the solution is unquestionably in sight.

The process has been made to fit in with and serve the future demands of the industry.

The modern trend towards the elimination of smoke and stream pollution are completely and adequately cared for.

With the low initial investment in the plant, and its complete independence of the coke market, water gas to-day is a serious competitor of the coal gas process except in those localities which have had an exceptionally favourable coke market.

THE PRODUCTION OF SMOKELESS DOMESTIC FUEL.—VII.

By John Roberts, D.I.C., M.I.Min.E., F.G.S., Author of "Coal Carbonization: High and Low Temperature."

(*Continued from p. 265.*)

THE TURNER PROCESS.

In common with two systems previously described, this one embraces internal heating and the use of steam; but here one of the objects is to produce a minimum yield of gas and a maximum yield of liquid distillates. The coal is treated in a vertical metal retort, being introduced through a hopper at the top of the retort, provided with steam-tight valves above and below. From the hopper the coal drops first into a pre-heating chamber, and then into the carbonizing retort, coming to rest upon an Archimedean screw near the base. The screw serves as an extractor, the rotation of which causes the fuel to sink slowly and uniformly within the retort, and to drop into a cooling chamber below when coking is complete. The cooling chamber is provided with steam-tight valves above and below. At the top of the retort a vapour outlet valve is provided. This is designed so that it remains closed until the pressure of steam and volatiles generated within the charge is sufficient to force it open. This pressure is usually 3 or 4 lbs. above atmospheric, and the valve opens instantaneously, and remains open for 15 or 20 seconds, thus allowing the volatiles to escape. When the pressure falls to the desired minimum the valve closes again.

Steam Heating.

Superheated steam at low pressure is admitted at the bottom of the retort, and while the top valve is closed the steam forces its way into the voids between the particles of coal, and thus raises it to the desired temperature. Meanwhile, the evolution of hydrocarbons is repressed to a certain extent, but as soon as the pressure rises sufficiently to force open the top valve, the gases and steam rush through into the condensers, and the volatiles come off freely as a result of the drop in pressure. As the temperature of the steam also drops at this instant, the volatiles pass into a stream at a lower temperature than that at which they were evolved from the coal. This obviates "cracking" of the hydrocarbons, and results in a maximum yield of liquid hydrocarbons.

The steam is generated in an external boiler, and passes through a superheater before entering the retort. The volatiles are condensed and the oils collected. The soft semi-coke ignites readily and burns smokelessly, and is sold to householders, bakers, and others. On account of the method of extraction it would appear that a fairly large proportion of fines would be produced, unless the fuel was of a hard, dense nature.

Metal Construction.

A plant at Airdrie, Scotland, has been in operation for more than a year, treating 10 tons of coal per day, yielding 30 gallons of oil and 12 cwt. of fuel per ton. The retort and chambers are constructed of iron and steel; and provided carbonization is conducted at about 550° C., the metal should "stand up to it." Previous experience with cast-iron retorts heated at 600° to 650° C. has shown that, except where carefully nursed, they are unsatisfactory. The use of 1 p.ct. or so of manganese in the iron will prevent growth, but it has been found that a special grade of cast-iron will easily stand temperatures exceeding 650° C., even up to about 800° C. The use of metal of this kind for low-temperature retorts was suggested by H. P. Hird, whose system will now be described, as it presents one or two novel features.

THE HIRD PROCESS.

The main drawback of several low-temperature processes is the slow rate of carbonizing. Hird's first object was to increase the speed of coking, and this he accomplished by providing a passage-way within the charge so that the volatiles as they were evolved took an inward, instead of an outward, path. It had already been demonstrated on a laboratory scale by A. W. Warner that, if the volatiles were exhausted through the centre of a charge, the time of carbonization was reduced to about one-half of that taken when the volatiles took an outward path, employing the same temperature. This was due mainly to the fact that the moisture and gases driven off did not pass through a zone higher than that at which they were evolved. Consequently, there was no unnecessary heating of these products. Moreover, the hot products during their inward travel impart their heat to the coal and assist in the carbonization, effecting a further economy of heat. The plan adopted by Warner in his experimental retort was to insert a perforated pipe up through the bottom of the retort into the centre of the charge, and exhaust the gases through this in a downward direction. The use of a perforated pipe in practice would offer many disadvantages, and would hardly be practicable.

Causing Volatiles to Travel Inwards.

Hird conceived the idea of providing a suitable blade which could be revolved in the middle of the charge and maintain a central outlet. The blade, or rod, finally adopted consists of a solid rod of diamond shape in section, which, during rotation, forms a central aperture larger in area than that of the rod, thus providing an escape for the volatiles. It was found that with this device carbonization proceeded comparatively rapidly, and the rod had the effect also of repressing any tendency of the coal to swell. The rod is given a half twist through its length, so that with easy-working coals it could be given a right-hand turn to compress the fuel, but with "sticky" coals a left-hand turn would facilitate motion. The rod is revolved very slowly, making one revolution per minute.

It was found that the volatiles passed inward towards the central aperture, taking the line of least resistance, and that the products left the retort at about 100° C. As the gases always travelled from a higher to a lower temperature zone, no "cracking" of the hydrocarbons took place, and the oils collected were void of free carbon.

After a few months' experimenting with retorts of ordinary cast iron, it was found that they showed signs of collapse, due to local overheating and flame contact. It was then decided by Hird to resort to the use of a special grade of cast iron, known as Low Moor cold-blast iron, which successfully withstands higher temperatures, though the carbonizing temperature is still restricted to 600° to 650° C. Hird has good reason to limit his temperature, for he has found that if he employs a temperature of 900° C. the volatiles cease to take an inward path, but pass outward as in gas retorts and coke-ovens, and that the coking period is thus increased.

In the retorts now under construction the diamond-rod stirrers

are spaced about 2 ft. apart, five rods being used in each retort. The retorts are to be worked intermittently, and the rods are rotated by mechanical means. The width of each retort is about 12 in., the height about 12 ft., and the length about 9 ft. 6 in. The process is controlled by British Carbonised Fuels, Ltd.

SOLID AND LIQUID PRODUCTS.

The main product obtained on carbonization of coals of about 34 p.ct. volatile content is a dense smokeless fuel containing up to 10 p.ct. of volatile matter. It is firm enough to stand handling and transport, and kindles readily. It is, of course, suitable for use in the open grate. About 14 or 15 cwt. of semi-coke per ton of coal is produced. The yield of oil is about 22 gallons per ton. This oil has a tar acid content above 30 p.ct. It is devoid of free carbon, and when distilled down to cracking point yields 12 p.ct. of pitch; but Hird maintains that this substance is not pitch in the ordinary sense, being more of a resinous nature. The oil produced from Durham slack gave:

Water	2 p.ct.
Tar acids	38 ,,
Neutral oil	60 ,,

From 126 gallons of neutral oil the following fractions were obtained:

25 galls.	spirit up to 200° C.
32 ,, ...	light creosote oil to 270° C.
32 ,, ...	heavy oil to 320° C.
25 ,, ...	high boiling oil to 370° C.
12 ,, ...	oil, vaseline nature, above 370° C.

The operation of the new plant, when completed, will be watched with considerable interest, as important results are expected.

THE "COALITE" PROCESS.

In the "Coalite" process employed by Low-Temperature Carbonisation, Ltd., at Barnsley, the coal is heated at about 550° C. in tapered metal tubes, having a mean diameter of about 5 in. The system appears to be a development of that proposed by Parker in 1907, B.P. 18,118, 1907. The yields of products are the normal for low-temperature work. When prepared from washed coals, the fuel is satisfactory, provided it is properly carbonized to yield firm semi-coke. When under-carbonized, the fuel readily crumbles and produces excess breeze.

TOPICAL ADVERTISING.

DEPARTMENT SHOW ROOMS.
AFTER 100 YEARS SERVICE THERE ARE STILL NEW USES FOR GAS
THE HISTORY OF GAS HAS BEEN ONE LONG PAGEANT OF PROGRESS.

A particularly well organized historical pageant was recently held at Sutton Coldfield, Warwickshire, in commemoration of the fourth centenary of the granting to the Borough by Henry VIII. of a charter giving to the inhabitants the Manor and Chase, which they hold to this day

Sutton Coldfield is supplied with gas by the City of Birmingham Gas Department; and it will be seen from the accompanying photograph that the Department responded very effectively to the appeal which the pageant promoters made to shopkeepers to give special window displays. The historical note struck by the pageant was made full use of in slogans employed. It is interesting to note that a very effective historical comparison was made by showing a modern gas cooker in the same window as an example of one of the earliest types of gas cooking stoves. This comparison proved in every way more attractive than contrasting a gas cooker with an old coal range, and had many advantages over it from a window-dressing point of view.

A large proportion of the personnel at the Sutton Coldfield Branch of the Gas Department took part in the pageant.

WATERLESS GASHOLDER FOR MANCHESTER.

The order has been placed with Messrs. R. & J. Dempster, Ltd., of Manchester, for a 5-million waterless gasholder to provide storage at the Bradford Road Works of the Manchester Gas Department, where the gasholder accident occurred last August. The holder will be erected upon a circular wall about 15 ft. high, so that the entire space underneath the holder can be utilized for storage purposes, for it will be erected adjoining large workshops where stoves, meters, &c., are renovated and repaired.

Before placing this order, the Gas Committee visited Messrs. Dempster's works to inspect the new machinery installed for the purpose of bending the shell plates and milling the stanchion flats, &c., together with their other appliances which have been altered and adapted for the purpose of manufacturing waterless gasholders.

At Messrs. Dempster's works an entirely new bay has been made to house the special machinery, together with overhead cranes and other equipment which the new departure calls for; and the visiting Committee appreciated very highly what they had seen, and recommended the adoption of the waterless holder with the fullest confidence. Their recommendation received the unanimous approval of the Council.

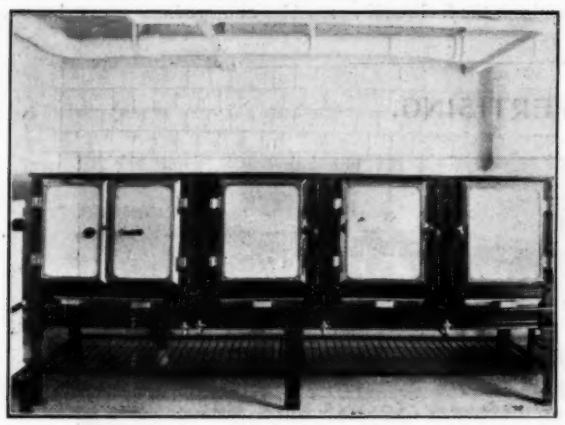
Gas Salesmen's Day.—Arrangements for the Annual Meeting of Gas Salesmen were considered at the meeting of the Chairmen and Secretaries of the Circles held in London recently, and the Executive Committee have since approved a recommendation that, in view of the increasing interest in the British Industries Fair, Birmingham, and the fact that it is hoped to organize an enlarged Gas Industries Section at the 1929 Fair, the annual meeting of gas salesmen shall be held in Birmingham during the period of the Fair, and not during the autumn, as has been the practice in the past. Two days are to be given to the meeting—namely, Feb. 27 and 28 next; the afternoon of Wednesday, the 27th, being devoted to a business meeting which will be addressed by an outstanding man in the business world, and the following day to an official visit to the Fair.

GAS EQUIPMENT AT THE WESTON-SUPER-MARE NEW HOSPITAL.

The kitchen equipment of the Queen Alexandra Memorial Hospital, Weston-super-Mare, which was opened on July 6 by the Duke and Duchess of York, is noteworthy for its wide range of gas-heated appliances of the most modern type. The kitchen is a light and spacious one, and is finished throughout in white glazed tiles. Plenty of light enters through a large central wired glass roof.

All the apparatus has been specially designed for, and made to the specifications of, the Weston-super-Mare Gaslight Company; and for the accompanying illustrations we are indebted to Mr. T. W. Luckhurst, the Secretary of the Company. The equipment installed necessitated the provision of special supply pipes, and will cater for approximately 200 persons. Included in the gas-heated equipment are the following appliances:

Main Kitchen.—One pastry and three roasting ovens on tall stands, a vegetable and pudding boiler, a milk sterilizer, a

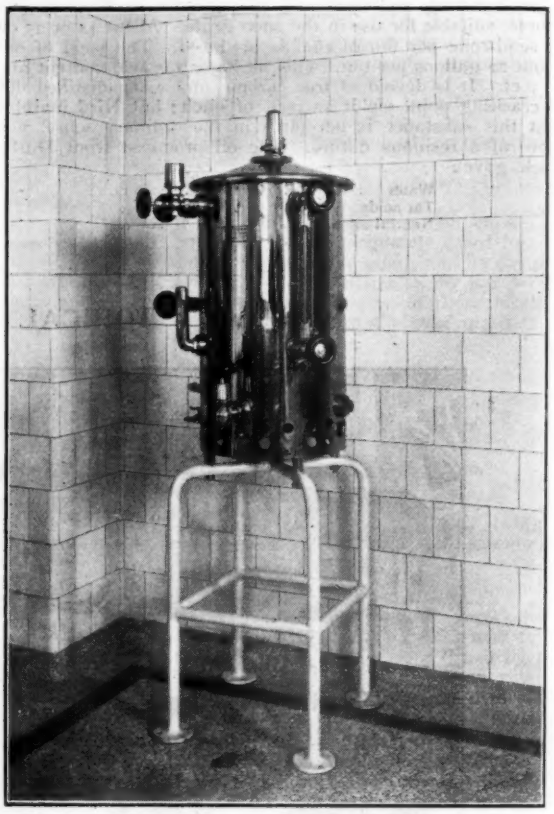


The Pastry and Roasting Ovens.

vegetable boiler, a beef tea extractor, a carving table with bain marie and overhead gear, a Segar grill for quick service and special requirements, a Stott instantaneous boiler for the continuous supply of boiling water, and a large boiling table with an assortment of boiling and grill burners. All the foregoing are specially finished in white enamel and nickel-plate.

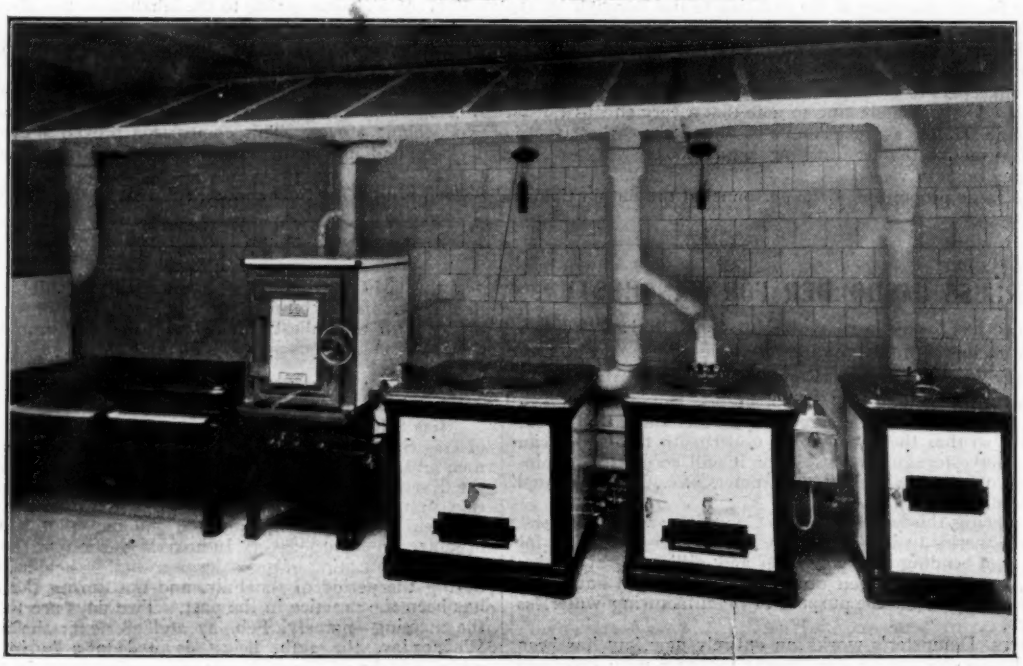
Fitted over the whole of the apparatus is a specially-designed hood of glass reinforced with wire. A fireproof flue pipe and ventilating shafts with revolving cowls take off all steam and products of combustion, and the whole installation represents the very latest practice.

In the rear kitchen is a 3-chamber "Vortex" washing machine supplied with steam from a modern gas-heated steam boiler, for the mechanical washing of dirty plates, dishes, &c. There are a gas-heated "Super-Electrolux" refrigerator for the preservation of meat and foodstuffs, and a special potato peeling machine which mechanically peels 10 lbs. of potatoes at one time without being touched by hand. The kitchens attached to each ward are fitted with a plate-warming oven with hotplate and special hood.



One of the Special Sterilizers.

In the sterilizing room are three special gas-heated nickel-plated sterilizers on white enamelled stands; two being used for instruments and one for water. The X-ray room is heated by steamless gas radiators, and the waiting rooms are fitted with gas fires with surrounds to match.



THE BOILING AND STEAMING PLANT.

RECONSTRUCTION OF PICCADILLY CIRCUS STATION.

Mainlaying Work of the Gas Light and Coke Company.

By H. J. ESCREET, B.Sc, Assistant Distributing Engineer to the Gas Light and Coke Company.

The accompanying drawing gives a good idea of the magnitude of the work of reconstructing the new station for the London Electric Railway at Piccadilly Circus. The new booking hall is circular in plan, and occupies a large part of the Circus; and the underside of the roof is only 4 ft. below the surface of the roadway. To enable the booking hall—which is approached by passenger subways from five corners of the Circus—to be built at this level, it was necessary to arrange for the removal or diversion of the large number of pipes and cables which crossed the Circus; and for this purpose, subways were constructed at a level well below the booking hall. The depth to the top of these subways averages about 20 ft. The existing pipe subway in Shaftesbury Avenue was connected to the new subways by an inclined shaft, and at the junction of each of the other approach roads with the Circus an interceptor was constructed. These interceptors extend across the roadway from kerb to kerb, and are connected to the pipe subways by an inclined or vertical shaft.

The water, hydraulic power, electricity, and telephone authorities have laid new pipes and cables through the subways, and up to the interceptors, and these have been connected to the old mains where they cross the interceptors. In this way, nearly all the pipes and cables, except the gas mains, crossing the Circus, have been thrown out of use, and only a few small mains for supplying the premises fronting on the Circus remain; the majority of these are in the footways.

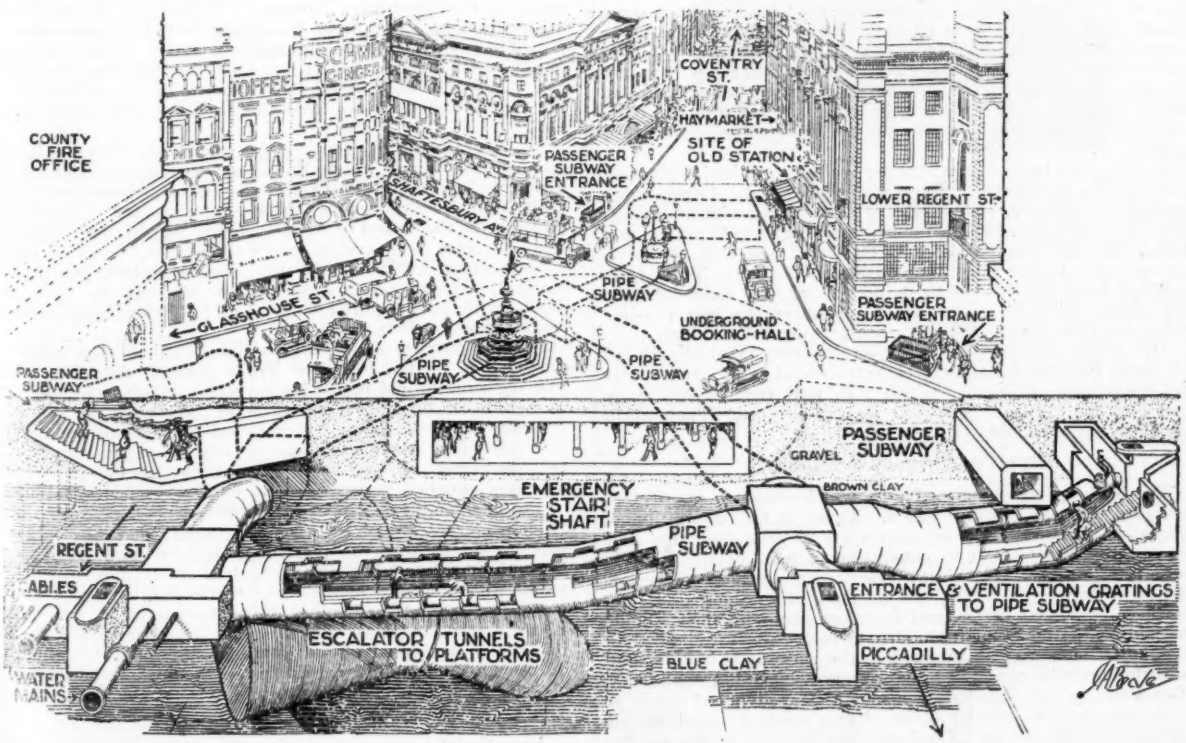
It was considered inadvisable to divert the gas mains to the subways, owing to the difficulty of ensuring adequate ventilation, and the consequent danger should any leakage occur. The mains crossing the Circus comprised 20-in. and 18-in. mains from Regent Street, 18-in. and 12-in. mains from Piccadilly, 20-in. and 14-in. mains from Lower Regent Street, an 18-in. main from Coventry Street, and a 10-in. main in the Shaftesbury Avenue subway. These were all interconnected in the Circus. There were also several 6-in. and 8-in. mains connected to the larger ones. In addition to these low-pressure mains, a part 6-in., part 8-in. main for high-pressure lighting crossed the Circus.

It was decided to reduce the number of mains crossing the Circus to a minimum by substituting for the low-pressure mains a 24-in. main from Piccadilly to Coventry Street, with a branch to Lower Regent Street. The existing mains in these streets were linked up to this new main at the side of the interceptors farther from the Circus. The mains in Regent Street were connected together near the interceptor, and a 24-in. main was laid through Air Street connecting the larger mains in Regent Street to those in Piccadilly.

This work was carried out in 1926; and 24-in. steel pipes were laid over the interceptors at Piccadilly and Lower Regent Street, temporary connections being made to the old 18-in. main across the Circus. It was not possible to lay the new main across the Circus at that time, owing to the underground plant of other authorities.

By the spring of this year, the other underground plant had been transferred to the subways, and a start was made with the laying of the 24-in. main connecting Coventry Street, Piccadilly, and Lower Regent Street. This main is now almost completed. It is laid with a cover of from 1 ft. 4 in. to 2 ft. 9 in., and is carried over the interceptors and passenger subways in pipe bays formed by spacing the roof girders as required. The whole of the main is surrounded by at least 6 in. of concrete. Welded steel pipes with flange joints have been used, to reduce to a minimum the possibility of leakage, and to avoid any risk of fracture. The concrete serves to protect the pipes from corrosion. The high-pressure lighting main has been relaid in steel pipes with rigid joints, and is protected by concrete.

The chief difficulty experienced in carrying out these alterations has been due to the necessity for avoiding, as far as possible, obstruction to the traffic. Work has been continuous, night and day, and a large proportion of the trenches have been excavated at night and covered by day, so that traffic could pass over them. The trenches have been covered by using 12 in. by 6 in. timbers with a bearing of 18 in. at each end on the road concrete; the wood block paving being trimmed back, and the ends of the timbers chamfered off to the level of the road surface. The difficulty of the work has been increased by the shortness of the "night" in this area—about 1 a.m. to 7 a.m.—and the fact that during this period concrete breakers cannot be used, owing to the noise they make. Most of the connections with "live" mains have been made on Sundays or in the early morning, when the timbers over the trenches could be removed.



THE PIPE SUBWAY AT PICCADILLY CIRCUS (JANUARY, 1927).

[Copyright of the drawing is with the Underground Electric Railway Company of London, Ltd.]

DISTRIBUTION AND SALES OF GAS IN 1893 AND IN 1927.

By Norton H. Humphrys.

The late Mr. Daniel Irving presented a paper to the Incorporated Gas Institute in 1895 (Transactions, p. 45, *et seq.*) under the title of "Unaccounted-For Gas," which included extensive and elaborate statistics directed towards drawing a line between losses caused by defects in distributing and measuring appliances and presumably subject to control, and by the differing physical conditions that affect the bulk of gas at the works meter as compared with the average at the consumers' meters, which must be accepted as unavoidable.

The object now in view is not concerned with unaccounted-for gas as a separate entity, or with the comprehensive character of the tables included in the paper; but to take out a few extracts which will serve as a basis for comparison of figures relating to distribution and sales of gas as supplied by the Board of Trade Return for the year 1893, with the corresponding items for 1927. In a table, extracts from the Gas Institute Transactions appear under A; those for 1927 under B; and under C are some items relating to public lamps and services, not directly available, and therefore absent from the Return, which can only be represented by conventional estimates.

Comparisons between A and B are subject to slight mental corrections. The respective numbers of undertakings do not agree; and A refers to the United Kingdom, while B is confined to Great Britain only. The 1893 Return covers 620 undertakings extended to 782 in 1927—an important proportion so far as numbers are concerned, but not of much consequence when the quantities of gas sold are considered. The Return refers to authorized undertakings only, and the additions for the most part are small concerns which have been taken into the statutory fold during the interim. They are not likely to affect the totals to an extent of more than 2 or 3 p.ct., and may be accepted as an off-set against the secession of the Irish Free State.

Improvement in Appliances.

A more important feature is the improvement in appliances used not only for lighting, but also for all other purposes, which has resulted in an all-round increase of "duty" per c.ft. of gas consumed. In 1893, flat-flame and inverted regenerator ring burners were the chief agents for light, and the inverted incandescent type which now takes the lead was not in sight. There has been a phenomenal increase in the candlepower per c.ft. of gas consumed, partly absorbed by a general demand for better light, but represented in more important proportion by a reduced consumption per burner, especially evidenced in public lighting. Clusters of three or more large flat-flame burners, requiring as much as 150 c.ft. of gas per hour, or regenerator burners taking perhaps one-fifth of that quantity, are displaced by groups of bijou or medium inverted incandescent type which yield greater candlepower, but do not consume more than 10 to 12 c.ft. of gas per hour. An average living-room, dimensions about 15 ft. square, formerly lighted by means of three flat-flame burners consuming 15 to 18 c.ft. of gas per hour, is now more efficiently served by two incandescent burners which only require about half as much gas. Large reductions are also due to important improvements in design of gas cookers, fires, and all kinds of appliances for the production of heat or power.

In 1893, the incandescent burner was not received with open arms by the profession. Some were indifferent. Others were inclined to hostility, taking up the somewhat ambiguous position that, after allowing for the by-pass, there would not be anything like the economy of gas expected, and that the newcomer would reduce sales to a considerable extent. These forebodings have not materialized, and those who have followed the sound policy of giving their customers the best possible value are now among the more prosperous undertakings.

Mr. Irving constructed an elaborate analysis of the Board of Trade Returns for the eleven years ended 1893. It includes no fewer than 28 items, which will well repay much more attention than is required for the present purpose. They might well be continued, and brought up to date.

The Prepayment Consumer.

The leading item is sale of gas, which shows a satisfactory increase, the ratio being 1 : 2·8. There is no recognition of prepayment meters as a separate class in 1893, but now they exceed the quarterly, and constitute 55 p.ct. of the total in regard to number. This fact has led some observers to ascribe, if not the whole, at least the chief part, of the increased sales to the prepayment meter, and therefore some emphasis should be laid on the fact that the quarterly meters bravely hold their end up by means of an increase in the ratio of 94 to 171, notwithstanding the economies due to improvements in appliances. The average per quarterly consumer has advanced some 20 p.ct., though the smaller class of user tends to predominate among the newcomers. Obviously the increase in the number of appliances used is much larger than these figures indicate.

The appreciation of the prepayment meter is a strong testimonial to the advantage of retaining control right through to the burners, which should ensure the use of the most appropriate and up-to-date appliances and competent workmanship. The gas undertaking is at a disadvantage in respect of both items when the work is carried on by parties who have no interest in sales of gas; and therefore the modern tendency is towards specifications and other indirect means of control. Prepayment fittings do not escape the attention of quarterly users, and are a useful antidote to the evil effects of unsuitable, antiquated, or bad-conditioned appliances, retained in use on the assurance of interested parties that any trouble or inconvenience is inseparable from "the gas," and therefore the cost of modern improved appliances would be wasted. It has contributed to an improved status of gasfitting operatives, also of materials, and to the development of sales departments and showrooms. This paragraph is not complete without reference to the work of the British Commercial Gas Association, which should not pass unnoticed when increased sales of gas are under review.

Public Lighting.

The consumption of gas for public lighting has increased, though the average per lamp has fallen from 16,425 c.ft. in 1893 to 10,833 c.ft. in 1927. Notwithstanding a tendency towards economy by local authorities, on account of increased expenses in other directions, it has completely recovered from the set-back caused by restriction in 1926. Taking the average number of lamps per mile at 20 for 1927, in place of the 22·2 returned in 1893, the total is not far short of one million, showing that in spite of strenuous and sometimes favoured competition, gas retains by far the larger share of the public lighting. The whole of the reduction per lamp must not be set down to the incandescent burner. Somewhat liberal estimates were formerly in vogue as a cover for contingencies. Better makes of lantern are now used, and in many ways the public lighting is more closely looked after to-day than in 1893, and substantial economy in consumption of gas is a result.

The increased length of mains, almost exactly double, may be taken as a fair indication of the length of road requiring artificial lighting, for, except for trunk supplies, mains are not likely to be laid in uninhabited areas. Probably there is now more care for outlying districts, and the coming of night motor traffic has increased the demand for all-night lighting in small towns. The motor 'bus and the motor car are responsible for a phenomenal expansion of townships, large or small, by the addition of extensive suburbs.

In discussions relating to unaccounted-for gas, there is a tendency towards accepting the Board of Trade Return as a fair presentation of the whole story, and to overlook the fact that it is lacking in at least one important respect. Loss is not necessarily confined to the main pipes, but may occur at any point between the works meter outlet and the several inlets to the consumers' meters. Sometimes we meet with suggestions of losses from the gasholders, but while there is possibility of leakage on the upper parts of a lofty structure going on for months or even years without detection, the writer has a better opinion of his colleagues than is consistent with the supposition that loss from this source is other than exceptional.

A more important item is the enormous increase in the number of branch connections and services. There is no fixed rule for distinguishing between mains and services, or the limits that are observed, when preparing returns of the length of main for the Board of Trade. Some regard pipes less than 2 in. diameter as a service, others confine the term to a supply for one meter, irrespective of size. For large factories, railway stations, theatres, &c., a service of any size up to 12 in. diameter may be required; or a 1½ in. "service" may serve to supply three or four small users.

For the purpose of arriving at the length of pipe which is not covered by the Board of Trade Return, we will assume that each meter and public lamp requires a separate length of service, averaging 30 ft. per meter in 1893, 40 ft. in 1927, and a steady 40 ft. per lamp. If not considered correct as applied to a particular district, a more appropriate figure can readily be substituted. In the former period, the greater part of the premises supplied verged directly on the roadside; but many of the later additions consist of suburban residences, or Council houses, set well back from the road; and therefore the average length of service is taken as 40 ft. in 1927.

On this moderate basis, the length of service pipe was nearly 21,000 miles in 1893, nearly equal to the length of mains; but it has subsequently advanced more than fourfold, more than 1½ times the length of mains. The increase in meters and public lamps means a corresponding addition to the number of branch connections, which in these days of heavy traffic are subjected to greater stress than was usual in 1893.

High Pressure and Leakage.

An optimistic gas engineer foresees a time when the by-pass valves would be fully open during the greater part of the 24 hours, and the useful function of the governor confined to the

remainder. Some considerable amount of progress has been made in that direction during the last 34 years by a substantial increase in supply pressures. Some experiments on by-pass jets show that in practice the loss through pin holes is increased by additions to pressure to a greater extent than is indicated by the theoretical rule. But taken over the year, the general experience is that, if the system is in efficient order, increased supply pressure does not necessarily mean a proportionate increase in leakage. The average pressure in the mains at times of heavy consumption is appreciably less than that at the governor outlet; and defects are rendered evident, under higher pressures, which formerly might have failed to attract attention. The bulk of the gas as measured at the consumer's meter would be reduced about ¼ p.ct. by an additional 1 in. pressure, and greater stress would also be thrown on the working parts of the machine. Increased supply pressures cannot be expected to assist the item of unaccounted-for gas.

A certain proportion of the gas used serves the works, offices, and perhaps the manager's residence, and is neither directly paid for nor recognized in the sales. The usual practice is to pass it through meters for the information of the management, but inclusion in the sales, and charging to an appropriate item under expenditure, are much less common. No recognition of this factor appears in the official returns, and to cover the deficiency, Mr. Irving adopts an estimate of 1 p.ct. on the make. This proportion is also retained for the 1927 accounts, though obviously free demonstrations, showrooms, &c., are used to a greater extent to-day than in 1893. The 1 p.ct. was too much at that time, or is not enough to-day. While not unavoidable, it comes under a different category from an uncontrollable loss, and is better dealt with as above suggested.

In the circumstances, a reduction in unaccounted-for gas of 2·14 p.ct. on the quantity of gas manufactured, from 341,000 to 317,000 c.ft. per annum per mile of main only, and from 2600 to 1514 c.ft. per branch connection, is not bad work. It suggests better supervision, sounder pipes, less loss through meters. The balance between manufactured and accounted-for may appear appalling, but it includes the unavoidable causes, and must not be set down as leakage pure and simple. The margin which does not come under control is increased rather than otherwise, and the reduction which has been secured is due to better supervision, sounder material and workmanship, and less slip through meters.

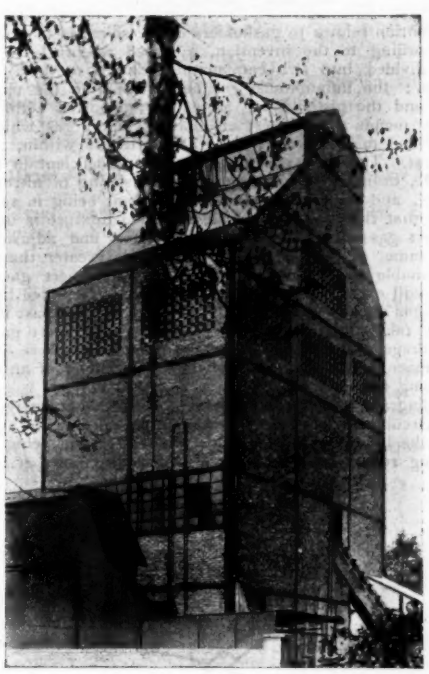
The 1920 Act is responsible for an addition to the unaccounted-for, represented by the difference between the supplied and the declared value. The latter is the unit of payment, irrespective of the calorific value actually received. This addition is more apparent than real, as under the illuminating power standard, a margin of at least 5 p.ct. was required. Large undertakings can reduce it to 1 p.ct. or even less; and in any case a smaller margin is possible where the calorimeter has eclipsed the photometer.

—	A.	B.	C.	
			1893.	1927.
Gas sold—				
Quarterly meters, 1000 c.ft.	93,646,496	170,754,134	..	..
Prepayment meters, 1000 c.ft.	..	99,520,075	..	..
Public lamps, 1000 c.ft.	8,239,874	9,927,353	..	..
Total	101,886,370	280,201,562	..	..
Gas not chargeable, estimated as 1 p.ct. on manufacture, 1000 c.ft.	1,107,817	2,976,974	..	..
Gas not accounted for, 1000 c.ft.	7,787,601	14,518,919	..	..
Gas manufactured	110,781,788	297,697,455	..	..
Number of meters—				
Quarterly	2,451,585	3,899,061	..	..
Prepayment	..	4,787,278	..	..
Total	2,451,585	8,686,339	..	..
Number of public lamps	507,226	..	..	916,420
Total length of mains, miles.	22,826	45,821	..	..
Gas sold—				
Average per quarterly meter, c.ft.	38,198	43,783	..	..
Average per prepayment meter, c.ft.	..	20,790	..	..
Average per public lamp, c.ft.	16,425	..	..	10,833
Average per mile of main, including public lamps, c.ft.	4,463	..	..	6,136
Average per mile of main, public lamps only, c.ft.	361	..	..	..
Per mile of main, number of meters	107	190	..	..
Per mile of main, number of public lamps	22·2	..	..	20
Length of service pipe in miles, allowing 30 ft. per meter	..	..	17,123	..
Length of service pipe in miles, allowing 40 ft. per meter	..	..	..	65,806
Length of service pipe in miles, allowing 40 ft. per public lamp	..	..	3,842	6,942
Total	..	..	20,965	72,748
Length of service pipe and mains in miles, total	..	..	43,791	118,569
Gas not accounted for—				
P.ct. on make	7·02	4·88	..	..
Mile of main, 1000 c.ft.	341	317	..	..
Mile of main service, 1000 c.ft.	..	..	371	453
Mile of main and service, 1000 c.ft.	..	..	192	200
Per service connection, c.ft.	..	..	2,600	1,514

GROWTH OF THE PINNER GAS COMPANY.

[From the July issue of "West's Gas."]

The area supplied by the Pinner Gas Company comprises the villages of Pinner, Northwood, Eastcote, Ruislip, Ickenham, and Harefield. There are no fewer than eleven railway stations serving the districts named, the growth of which can be judged by the tremendous developments which have taken place. In the year 1901 the annual make of gas was 22½ million c.ft., and this had increased last year to 218 millions. In 1901 the length of mains in the district was 22 miles, while at the present day it is 62 miles, serving approximately 5500 consumers, whereas in the year 1901 the number of consumers amounted to 700.



The works are situated in pleasant surroundings about half-a-mile from the Metropolitan Railway Station, and have been in existence for 64 years. The area of the works is approximately 2 acres, so that 109 million c.ft. of gas per acre is manufactured upon the site.

The installation of Glover-West vertical retorts, which was brought into operation in March this year, comprises eight 40-in. "New Model" retorts in units of two, with two producers in a retort house of the usual steel-framed, brick-panelled design. Small coal is brought to the site in road vehicles, which are discharged over a grid to the feeder trough of an encircling lip-bucket conveyor which elevates and distributes the coal in the 48-hour coal bunkers above the retort bench, and receives the coke from the bottom mouthpieces. The waste-heat boiler is of the natural-draught type with superheater, and generates sufficient steam for the supply of the retorts.

The method of operation is now so well known that no description is necessary here. The results have been up to expectations.

The following were the observed results during three consecutive weeks:

—	1.	2.	3.
Daily production in c.ft.	510,340	497,890	550,740
Retorts in operation daily	7·05	7·26	7·86
Daily yield of gas per retort, c.ft.	72,388	68,580	70,070
Gas made per ton, c.ft.	16,060	15,630	16,550
Calorific value, B.Th.U. per c.ft.	516	519	513·5
Therms per ton	82·87	81·09	84·96

The plant is giving every satisfaction in working.

REGISTER OF PATENTS.

Cookers.—No. 292,653.

STEWART, C., of Caulfield, near Melbourne.

No. 7220; March 15, 1927.

This invention relates to improvements in gas cookers and the like, and has been devised in order to improve the circulation of the gases and heat.

The waste gases from the cooking chamber pass in succession through baffled jacket spaces in the side or sides, back, and top; the invention being characterized by the fact that the gases escape through orifices adjacent the level of the burners, and are directed in their travel in the jacket by baffles so disposed angularly as to cause the gases to travel obliquely therein, thus providing a maximum retardation of the waste gases in their passage to the flue and increasing the heating value thereof.

The actual arrangement of these baffles is the subject of sub-claims; and the details are fully described and illustrated in the complete specification.

Gasholders.—No. 293,098.

NIELSEN, H., of Muswell Hill, and LAING, B., of Westminster.

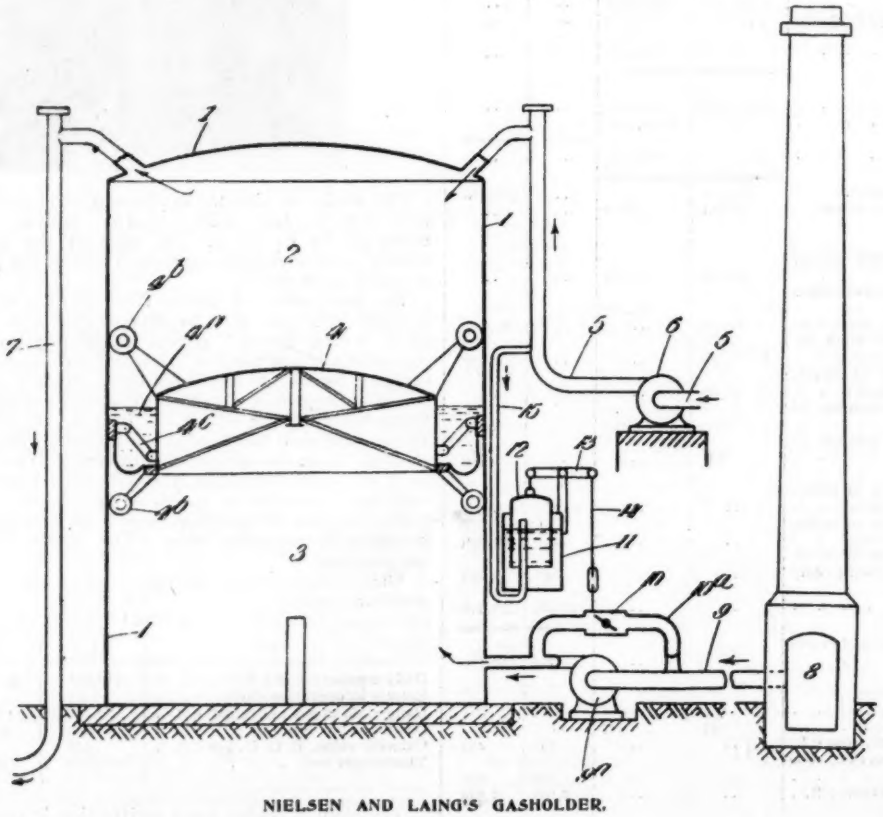
No. 8494; March 28, 1927.

This invention relates to gasholders of the so-called dry or tankless type. According to the invention, a closed receptacle is provided which is divided into two compartments by a movable and gas-tight piston; the inflammable gas being stored in the upper compartment, and the piston being adjustably supported within the receptacle by means of an inert or relatively inert gas which is admitted to, and maintained at a suitable pressure within, the lower compartment. The inert gas may be any gas deficient in oxygen—for example, ordinary combustion gases consisting of nitrogen, carbon dioxide, and oxygen, the latter constituent being in so small a percentage that the formation of an explosion mixture is impossible. As the inert gas is stored beneath the piston and adjustably supports the same, and as its specific gravity is greater than that of the inflammable gas, it will be clear that the inert gas beneath the piston will exert a greater pressure than that exerted by the inflammable gas above. Consequently, any gas leakage past the piston which may take place will consist of the heavier inert gas; and, as any leakage of inflammable gas into the atmosphere is impossible, the invention is claimed to obviate any danger of an explosive mixture being formed.

In the diagram which we reproduce, 1 is a completely enclosed gas-tight circular or polygonal container provided with a movable piston 4; the latter having an oil or tar seal 4*a* and being provided with guiding rollers 4*b*, 4*b*, and seal supporting links 4*c*, 4*c*. The piston 4 divides the container 1 into two compartments, the upper compartment 2 being adapted to contain the lighter and inflammable gas, and the lower compartment 3 being adapted to contain the inert and heavier gas. The inflammable gas is forced into the space 2 above the piston from a gas main 5 by means of a gas booster 6; and the pipe 7 conducts the gas, as and when required, from the space 2 to the distribution system. 8 is a chimney stack conducting ordinary flue or combustion gases to the atmosphere from a boiler plant, retort setting, or other source; and 9 is a pipe for conducting the combustion gases or a portion thereof to the space 3 beneath the piston 4. The combustion gases, which may be cooled and also cleaned if desired, are delivered by the constant pressure booster 9*a* into the space 3 at any desired temperature, and a by-pass 10*a* provided with a butterfly valve 10 enables communication to be established when desired between the pressure and suction sides of the constant pressure booster 9*a*. 15 is a branch pipe for establishing communication between the gas main 5 and the bell 12 of a small regulating holder or governor 11, so that any vertical movement of the bell 12 due to variation in the gas pressure within the pipe 5 and the compartment 2 will be communicated through a link and rod mechanism 13 and 14 to the butterfly valve 10 located in the by-pass 10*a*.

If the consumption of gas increases, the gas pressure in the space 2 will decrease; and as the pipe 15 is in communication with the pipe 5, the reduction in pressure will be communicated to the bell 12, and through the link and rod mechanism 13 and 14 the butterfly valve will close and an additional supply of inert gas will be passed by the booster 9*a* into the space 3, thus moving the piston 4 upwards and maintaining constant the pressure within the space 2. If, on the other hand, the consumption of gas in the distributing net decreases, the pressure in the space 2 will increase. The controlling bell 12 will again come into operation, but in this instance the butterfly valve 10 will be opened, thus allowing a quantity of the inert gas to escape, so that the pressure in the space 3 will be relieved. Consequently, the piston 4 will descend until equilibrium between the chambers 2 and 3 is again established. By adjusting the length of the rod 14 or by weighting the controlling bell 12, the pressure of the inflammable gases in the space 2 relatively to the inert gases in the space 3 can be maintained at any desired figure; and the pressure in the district is automatically regulated and maintained at the desired figure irrespective of fluctuations in demand.

By passing the inert gas through a heater prior to its entry into the space 3, or by mixing the inert gas with another gas or other gases obtained by the combustion or combustible materials in an adjacent furnace provided for the purpose, the temperature of the inert gas in the space 3 can be maintained sufficiently high to prevent thickening of the tar in the seal 4*a*, as also the formation of ice during very cold weather on the inside of the tank. In the case of combustion gases drawn from an adjacent stack, the gases are cooled down to any desired temperature—for example, by subjecting them to a cold water spray.



NIELSEN AND LAING'S GASHOLDER.

Coin-Freed Mechanism.—No. 292,705.

Simpson, S., of Exmouth.

No. 8583; March 29, 1927.

According to this invention, the coin carrier is provided as a disc mounted on the inner face of a stationary and adjustable circular plate, and a coinholder is mounted diametrically across the inner face of the disc. A space is provided at one end of the coinholder for the reception of a coin; and the other end is preferably formed as a narrow slot parallel with the axis of the coinholder to carry the inturned end of a plate, part of which projects so as to engage the teeth of the ratchet or measuring wheel. This plate is carried on the side of the coinholder and in the narrow slot in the coinholder, and is bent at the coin end at a right angle to cover the end of the coinholder. The plate is free to swivel at the inturned end, and is also free to slide on the side of the coinholder where slots and pins act as guides. Springs are provided to hold the plate close to the side of the coinholder and out of engagement with the teeth on the measuring wheel when no coin is in the holder. A block or pin of oblong section is provided to engage the edge of the coin nearest to the centre of the coinholder; and slots or holes may be provided in the coinholder to adjust the block or pin to suit the size of the coin to be used.

When a coin is inserted between the block or pin and the bent end of the plate, the latter is moved towards the outer circumference of the coin carrier, and the inturned projecting end of the plate engages the teeth of the measuring wheel. Upon the coinholder being rotated, the measuring wheel is turned therewith until the bent end of the plate comes in contact with a stop fixed on the interior diameter of the coinholder case, when the movement of the bent end of the plate ceases. The coin carrier and measuring wheel is rotated further, until the outer end of the coinholder is uncovered, when the coin falls through a slot in the case into the money box. The springs then withdraw the projection from the teeth of the measuring wheel, and the outer end of the coinholder is closed ready for the reception of a further coin. A second stop is provided on the interior diameter of the coinholder case to determine the movement of the coinholder.

Spraying Apparatus.—No. 292,889.

Chemical Engineering and Wilton's Patent Furnace Co., Ltd., Wilton, N., and Parker, J., all of Victoria Street, S.W. 1.

No. 7871; March 14, 1928.

This invention relates to apparatus for spraying, and particularly to such apparatus of the type in which the spraying is effected by causing two or more jets of liquid to impinge upon each other, and has for its object an improved apparatus.

The latter comprises a casing provided with a circular aperture and a hollow conical valve body, the edge of which is adapted to be seated against the internal surface of the edge of the aperture in the casing, except at equidistant regions where the edge of the cone is recessed along portions of its periphery, so as to provide narrow apertures or slits, through which apertures or slits the liquid admitted under pressure by a lateral inlet is forced out in two jets which impinge against each other, thereby causing the liquid to be projected outwardly in the form of spray. The valve body is carried on a rod adapted to be screwed in or out, so that by screwing the rod the valve body is separated from its seat, the slits are widened out, and any obstruction occurring at the slits is carried away by the liquid. The rod is maintained centrally of the casing by a disc provided with apertures for the passage of the liquid.

Safety Cut-Off Valves.—No. 292,887.

Bornefeld, G., of Wermelskirchen.

No. 6326; Feb. 26, 1928.

The object of this invention is to prevent the escape of gas from conduits for lighting and heating; and it consists in the provision of two coaxial valves mounted in a casing arranged in the conduit, the valves being adapted to open in the direction of flow of the gas and being subjected to spring pressure so as to remain closed if the conduit behind the valve should not be fully open or if it should leak.

The valve structure comprises hollow valve stems, one stem being arranged to telescope within the other, and a sleeve carried by the casing as a guide for one of the stems; one of the springs being arranged outside the respective valve stem, the other spring being arranged inside its valve stem.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for July 25.]

Nos. 20,544—21,213.

Andrews, A. H.—"Apparatus for quenching coke." No. 20,885.
Becker, A. C.—"Gas instrument adapted to be regulated." No. 21,019.
Brockbank, J. G.—"Carbonization of coal." No. 20,901.
Continuous Coal Carbonization, Ltd.—See Brockbank, J. G. No. 20,901.
Hider, G. E.—"Gas boiler." No. 21,045
Jones, F. W. Salisbury.—See Brockbank, J. G. No. 20,901.
Kauffmann, K.—"Gas stoves." No. 20,854.
Kurth, H.—See Kauffmann, K. No. 20,854.
Pilot, I. H.—"Machines for crushing coke." Nos. 21,190, 21,191, 21,192.
South Metropolitan Gas Company.—See Andrews, A. H. No. 20,885.
South Metropolitan Gas Company.—"Hopper, &c., door operating mechanism." No. 20,886.
Stevens, J. H.—See Hider, G. E. No. 21,045.

[Extracted from the "Official Journal" for Aug. 1.]

Nos. 21,214—21,984.

Bakhuizen, J. W.—"Gas burner." No. 21,950.
Beard, G. F. H.—"Tankless gasholders." No. 21,541.
Milbourne, R. J.—See Beard, G. F. H. No. 21,541.
Toytot, L. U. de.—"Apparatus for production of producer gas." No. 21,949.
Wade, H. (Compagnie Continentale pour la Fabrication des Compteurs et Autres Appareils Soc. Anon.).—"Gas-meters." No. 21,611.
Wessel, C.—"Distillation of coal tar." No. 21,432.
Wiatt, J. P.—"Combination gas and water valves." No. 21,415.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Parliament was prorogued on Aug. 3 to Tuesday, Nov. 6.

Progress of Bills.

Rotherham Corporation Bill: Read the third time, with the amendments. Further amendments made. The Bill passed, and returned to the Commons.

Blackpool Improvement Bill: Returned from the Commons, agreed to, with amendments, which were considered, and agreed to.

Hull, Wrexham, Bourne, Dursley (No. 2), Bilston, Lincoln, Sheppey, and Worksop Gas Orders: Agreed to.

Royal Assent.

The following Bills received the Royal Assent on Aug. 3: Rating and Valuation (Apportionment), Windermere District Gas and Water, South Suburban Gas, Bournemouth Gas and Water, Dover Gas, Rotherham Corporation, Blackpool Improvement, Cleethorpes Urban District Council, Tottenham and District Gas, and London County Council (General Powers).

HOUSE OF COMMONS.

Progress of Bills.

Rotherham Corporation Bill: Lords' amendments considered, and agreed to.

Bilston and Sheppey Gas Orders: Approved.

Scientific Investigation and Research.

On Aug. 1, under Class IV. of the Civil Estimates, 1928, a sum of £133,085 was granted for scientific investigation, and £296,220, under Class VI., for the Department of Scientific and Industrial Research.

Gas Mantles.

Replying, on Aug. 2, to Mr. A. V. Alexander, who asked the President of the Board of Trade whether the imposition of a safeguarding duty in the case of the gas mantle industry had improved the general position of the firms engaged in the industry, Sir P. Cunliffe-Lister said he thought there was no doubt the duty had materially assisted the industry in this country.

Training for Salesmanship.

In answer to Mr. Fenley and Sir Nicholas Grattan-Doyle, Lord E. Percy, on Aug. 2, stated that he hoped to begin the new series of reports on education for commerce and industry by the publication of an introductory survey in October. He had not yet finally completed the constitution of the Advisory Committees in connection with the two special inquiries on training for salesmanship and engineering, but he was glad to be able to announce that Mr. F. W. Goodenough, C.B.E. (Chairman of the Incorporated Sales Managers' Association, and Executive Chairman of the British Commercial Gas Association), had consented to be Chairman of the former, and Sir Dugald Clerk, K.B.E., of the latter. The Committees would consist of representatives of trade and industry, associated with teachers and professors in technical colleges and universities, and he hoped that they would be, as far as possible, fully representative of the various branches of trade and industry with which they would be dealing. He had also invited the various associations of local education authorities to appoint representatives as members of a panel for the purpose of advising on the administrative aspects of technical education. The actual investigations would be carried out by selected inspectors of the Board, and the Committees would be mainly concerned to advise on the scope and methods of the investigations, and to review and comment on the findings. Regarding the regional inquiry into the organization of technical education in the Midlands area, Lord Percy said the Board's Inspectors had just completed a survey which would, he hoped, form the basis of discussions with the local authorities and schools in the area, on the one hand, and, on the other, with organizations of employers and workers concerned.

MISCELLANEOUS NEWS.

WELSBACH LIGHT COMPANY, LTD.

Offer of Imperial Chemical Industries.

The Seventeenth Annual General Meeting of the Company was held on Tuesday, July 31, at Winchester House, Old Broad Street, E.C.—Mr. J. R. YATES (the Chairman) presiding.

The SECRETARY (Mr. H. W. Edwards) read the notice convening the meeting and the report of the Auditors.

The CHAIRMAN, moving the adoption of the report and accounts, said: I do not propose to detain you long over these before dealing with the offer embodied in the circular accompanying the report. The record number of proxies received in support of the Board are evoked, I imagine, by the recommendation contained in the circular, rather than by the results recorded in the report, to which I will now turn. Trading during the past financial year has not come up to expectations. The unemployment prevalent in the coal districts of South Wales and Northern England, in the Lancashire cotton area, and elsewhere, reflects the position of trade generally. In the gas mantle industry itself, unity of policy and action have not been attained, despite great efforts to that end. Our endeavours in that direction have taken up a vast amount of time, and involved a great deal of anxious thought. It is still hoped that our views as to the wisdom of coming closer together may prevail.

EXTENSION OF INTERESTS.

In connection with our own business nothing has been left undone and no opportunity lost in trying to find fresh trade outlets. Much attention has been devoted to the study of a new industry capable of being worked in conjunction with the production of magnesia mantle rings in which we are interested—viz., the manufacture of electrical insulators. As the result of investigations at home and abroad, we entered into an engagement on behalf of this Company to take an increased interest in the joint enterprise. Several businesses have been investigated quite recently with the view of broadening our range of trade and increasing our turnover. With the like object, an opportunity was seized for securing and opening a new depôt at Edinburgh. Our Leeds depôt (destroyed by fire in 1926) was re-opened at the end of September last, and should enable more trade to be done as and when orders can be got. Here I may mention that the increase of about £7000 in the item of properties, &c., represents the approximate rebuilding cost of Leeds. Last year this sum, having been already recovered from the insurers, went to swell our cash assets at that date.

The main point in the accounts is that the profits of the year are insufficient of themselves to pay the diminished dividend of 2½ p.ct. In order to make that distribution we must absorb the amount brought forward from last year (£4323), and have slight recourse to reserves, leaving £269 to be carried forward to next year. Despite efforts to extend our trade, the immediate outlook, if we continue to run alone, is far from promising; and prices since the beginning of the present financial year have been considerably below those of last year.

PROPOSED EXCHANGE OF SHARES.

For years past some of us have realized that in combination, and in that alone, was salvation to be found for the gas lighting trade; and efforts have from time to time been made to bring that about. Although success in these endeavours was long withheld, we are at length making a step forward, in conjunction with no less a concern than Imperial Chemical Industries, Ltd. "I.C.I." (as it is often called) already holds a preponderating interest in Lighting Trades, Ltd., and J. & W. B. Smith—companies engaged in trade similar to our own. Discussions have been held with "I.C.I.," culminating in an offer received from that company on the afternoon of Tuesday, July 17, which my Board, on the same evening, communicated to you and to the public in general through the medium of the Press. For a moment I pause to refer to the appreciation expressed in the Press of the well-kept secrecy of our negotiations. I was certainly gratified to observe daily from July 9 to 16—*i.e.*, for the last week during progress of the negotiations—that there was not a single marking in Welsbach shares in the Stock Exchange official record of business done.

Now, what of the offer itself? Is it or is it not a fair and sound offer for acceptance by Welsbach shareholders? At an annual meeting here a year or two ago, an old and respected shareholder, criticizing our report, asked: "Is not public opinion in the market the best indication of what the report really is?" "Of course it is," was the affirmative answer from the body of the hall. Well, if we apply the same straight and simple test to the offer of Imperial Chemical Industries, Ltd., the opinion of the market as to Welsbach shares was 12s. 6d. on Monday, the 16th, the day before the offer, and 19s. or thereabouts on Wednesday, the 18th, the day after the offer. As to whether the price would again drop to 12s. 6d. or less if the offer fell through, you may be as well able to judge as I am. But, in my opinion, it is not likely to fall through. In the week since they received the circular containing the offer and form of assent, shareholders have already forwarded assents representing over 67 p.ct. (out of the required 76 p.ct.) of the total issued share capital of this Company; and they are still freely coming in. There are yet unexpired fourteen days of the period mentioned in the offer; but those who have not sent assents are recommended to lose no time in doing so. Assuming this deal to go through, there will be no market to speak of for the unexchanged Welsbach shares, while there is always a free and ready market for the "I.C.I." shares.

THE OFFER EXPLAINED.

It will be observed that the "I.C.I." shares offered carry dividend from Jan. 1, 1928; their financial year ending on Dec. 31—three months earlier than ours. For three months of this year (Jan. 1 to March 31) you will, by taking the offer, get over-lapping dividends—viz., that which you will in a few minutes be asked to declare on Welsbach shares up to March 31, and also the whole year's dividend which you may reasonably anticipate from Imperial Chemical Industries, Ltd. As to this I can, of course, offer no exact forecast. I can only tell you that for the past year, the first of their existence as a combination, they paid 8 p.ct. on the ordinary and 1¾ p.ct. on the deferred shares. On the latter shares the percentage rises much more rapidly than on the ordinary shares in the event of increased distribution of profits. Assuming that you prefer to hold and not cash your "I.C.I." shares, and assuming that the same rates of dividend and no more be paid by "I.C.I.," the return you will receive on your present Welsbach holding will be at the rate of slightly over 4 p.ct. But as you will have already been paid a Welsbach divdend up to March 31 this year, the "I.C.I." dividend (if continued as last year) would give you for the nine months from April 1 to Dec. 31, 1928, a return at the rate of 5¼ p.ct. per annum. The shares offered to us are not to be confused with the new "I.C.I." shares quoted at a lower price in the Stock Exchange Supplementary List. Those shares, I understand, only carry dividend from July 1, and not from Jan. 1 last, as is the case of those comprised in the offer. There has been some inquiry as to fractions under the offer. With regard to these, a single old Welsbach share would carry an immediate cash payment of 19s. 2d., made up of 18s. 6d. (being half an "I.C.I." ordinary share at the notional rate of 37s. per share) *plus* 8d. (being 1-20th of an "I.C.I." deferred share at the notional rate of 13s. 4d.), the total of the two sums making up the 19s. 2d. cash payment, in addition to the 2½ p.ct. Welsbach dividend to be declared to-day. This touches fractions only. For the general mass of shares you get, as shown in the circular, substantially par value.

SHAREHOLDERS RECOMMENDED TO ACCEPT.

For the reasons before mentioned, the Board have no hesitation in recommending all Welsbach shareholders to accept the "I.C.I." offer, in which case there is an exchange of shares and a new body of Welsbach shareholders. The Directors continue in office, retaining such qualification as is required. No arrangement has been made for their retirement. Some of them are appointed by the debenture stock trustees, who alone can remove them. The debenture stock will remain unaffected by the exchange of shares. In conclusion, I wish especially and emphatically to commend the loyal and hearty co-operation of all our Welsbach workers, beginning with the General Manager—probably the hardest worker of all—and to express the hope that, whatever the future may hold for this Company, they may be well looked after.

The motion for the adoption of the report and accounts, and the payment of a dividend of 2½ p.ct. (less income-tax) was unanimously carried; and a cordial vote of thanks was passed to the Chairman, Directors, and staff.

Newport (Mon.) Gas Company.—An interim dividend of 5 p.ct. per annum, less income-tax, has been declared on the consolidated stock of the Company for the past half-year.

New Companies.—The North of Ireland "L. & N." Company, Ltd., has been registered, with a nominal capital of £250,000; and Rainford Tar Products, Ltd., with a nominal capital of £1500.

Tideswell Gas Company.—The Tideswell Gas Light and Coke Company, at their annual meeting, had before them a report which showed a net profit for the year of £243. The Directors recommended the payment of a dividend of 5 p.ct. per annum, less income-tax, which would absorb £196, leaving £567 to be carried forward. The balance-sheet showed that the income from gas consumption, including meter rents, amounted to £1786.

Wandsworth, Wimbledon, and Epsom District Gas Company.—The Directors have declared dividends on the capital stocks of the Company for the six months ended June 30 at the following rates p.ct. per annum: 5 p.ct. preference stock, £5; Wandsworth "A," £8 15s.; Wandsworth "B," £7 5s.; Wandsworth "C," £6 2s. 6d.; Wimbledon, £6 17s. 6d.; Epsom, £7 7s. 6d.; and new ordinary, £6 2s. 6d.

Duffield Coal Products was registered as a public company on July 28 with a nominal capital of £300,000 (150,000 7½ p.ct. non-cumulative participating preference of £1, and 3,000,000 ordinary of 1s.), to adopt three agreements, 1 and 2 with Lindley Duffield & Co., and 3 with J. S. Harrison, to acquire and turn to account inventions for improvements in, or relating to, the production of gas and crude oil and other products from coal or other substances.

COAL TRADE REPORTS.

From Our Own Correspondents.

NORTH-EAST COAST.

The past week has been subject to holiday influences, and little new business has passed. The shortage of tonnage continues, and this weakens the position of collieries, for, even when they have orders booked, they are liable to be without boats to clear them, and to be left with coal on their hands. While the prompt position is thus weak, a certain amount of serious inquiry for forward periods encourages hopes of possible improvement. This applies chiefly to Durham coals, which seem to be in slightly better demand. Northumberland steams are still as badly placed as ever, and their plight is very serious.

Gas coals have been better taken, and, with an improvement in tonnage, they should begin to make a better showing. Prices are about the same, with Wear Specials quoted at 15s. 3d. to 15s. 6d. f.o.b., best qualities at 14s. 9d., and others 13s. to 13s. 6d. Coking coals are fairly well booked, and ask 13s. 3d. to 13s. 9d. Durham bunkers are variable, some of the best makes being well sold at round 14s. 3d., while the poorer qualities are short of trade. Gas coke is steadily quoted at about 20s. f.o.b. for shipment.

YORKSHIRE AND LANCASHIRE.

Gas coals in Yorkshire and Lancashire show a tendency to appreciate in value. Industrial fuels generally are not moving very freely, due, perhaps, to some extent to local holidays.

Export prices are at the moment somewhat discounted.

Domestic coal has not been in great demand during the past week, although stocks on hand at collieries have not depreciated in value.

The following are the Humber bunker and export prices, f.o.b. usual shipping ports:

South Yorkshire: Hards, Association, bunkers 17s. 9d. to 18s., export 14s. 9d. to 15s.; screened gas coal, export 14s. to 15s. 6d.; washed trebles, 14s. 6d. to 15s.; washed doubles, 14s. 3d. to 14s. 6d.; washed singles, 13s. 6d. to 14s.; washed smalls, bunkers 13s. to 13s. 6d., export 11s.; rough slack, bunkers 11s. 9d. to 12s. 6d.; smithy peas, export 16s. 6d. to 17s. 6d. per ton.

West Yorkshire: Hartley's (f.o.b. Goole), export 13s. 3d. to 13s. 9d.; screened gas coal, 14s.; washed trebles, 14s. 3d. to 15s.; washed doubles, 13s. 6d. to 13s. 9d.; washed singles, 13s. to 13s. 9d.; washed smalls, 10s. to 10s. 6d.; unwashed trebles, 14s.; unwashed doubles, 11s. to 11s. 3d.; rough slack, 8s. 9d. to 9s. 3d.; coking smalls, 7s. 9d. to 8s. 9d. per ton.

Derbyshire and Nottinghamshire: Top hards, bunkers 17s. to 17s. 9d., export 14s. 6d. to 15s. 6d.; cobbles, export 13s. 6d. to 15s.; washed trebles, 14s. 3d. to 15s.; washed doubles, 14s.; washed singles, 13s. 6d.; washed smalls, bunkers 12s. 6d. to 13s., export 10s. 6d.; unwashed doubles, export 11s. to 12s.; rough slack, bunkers 11s. 9d. to 12s. 6d., export 9s. to 9s. 6d. per ton.

Yorkshire, Derbyshire, and Nottinghamshire: Screened steam coal, 15s. to 16s. 6d. and 12s. to 13s. 3d.; gas coke, export 20s. to 23s.; furnace coke, 18s. 6d. to 19s. 6d.; washed steam, bunkers 16s. 3d. to 16s. 9d. per ton.

MIDLANDS.

Demand is further depressed this week by holiday influences. No coal will be raised in the Cannock and Warwickshire areas before Thursday, and practically no business will be done before Monday. Indeed, prospects of improvement are not to be expected for some weeks. Many works are engrossed in stocktaking during August, and under no necessity to buy. Gas coal is a poor market. Deliveries, of course, are constantly made against contracts, but in many cases consuming concerns do not find it convenient to take their full quota. While there is no pressure for slacks, supply and demand are fairly well balanced by reason of the reduced output. In a few cases "spot" lots may be picked up on favourable terms, but the experience is not general. Coalowners do not favour the policy of building-up stocks, preferring rather to limit output. The pits, therefore, are working not more than from three to four days a week, and those that can do the higher number are counted fortunate. The house trade is very quiet—nothing else is expected at this season of the year. A certain amount of stocking has taken place at the summer prices now prevailing, and a good deal more will probably take place before the end of the month.

Whitworth Vale Gas Company.—The Directors' report for the half-year ended June 30 shows a profit of £729 on revenue account, which, added to £310 brought forward, and £6 interest received, and reduced by loan interest, leaves a disposable balance of £942. Out of this the Directors recommend a dividend of 7 p.ct. per annum on the original shares, and of 5 p.ct. per annum on the "B" shares, less income-tax. The extraordinary general meeting convened for July 9 for the purpose of considering the sale of the gas undertaking to the Rochdale Corporation was duly held. The resolution approving the sale was unanimously passed by the shareholders present at the meeting.

Dvorkovitz Low-Temperature Process.—The Directors of Motor Fuel Proprietary, Ltd., have issued to shareholders a circular giving the results obtained from the plant erected at Slough to test the Dvorkovitz process, and describe the results as so "eminently satisfactory" that an equipment is to be put down to deal with 500 tons of coal per day. The Company are acquiring a piece of land in Nottinghamshire for this purpose, and also for erecting thereon a refinery for the treatment of the crude oil produced. The capital requirements from this will necessitate the formation of a new company. An order has been placed with Messrs. Ruston & Hornsby, Ltd., of Lincoln, for the first retort of a new unit of eighty retorts.

HASTINGS CO-PARTNERS' OUTING.

On Saturday, July 21, the second portion of the co-partner employees of the Hastings Gas Company had their summer outing. Owing to the exigencies of a day and night service, which necessitate a number of men always being on duty, the outing had to be arranged in two sections. The previous Saturday about one hundred and fifty enjoyed a motor coach ride through some of the best Sussex scenery, and rather more than that number made up the second portion on Saturday. In each case the rendezvous was Sevenoaks.

Following tea at Sevenoaks, a vote of thanks to the Directors for arranging the outing was carried with acclamation.

Mr. C. F. BOTLEY, Engineer and Manager, made a few remarks on the subject of co-partnership and its immediate application to the duties and welfare of the staff in its relations to the Company.

Following this, Mr. A. M. APEL (Chairman of the Co-Partnership Committee) expressed the opinion that in time to come much of the industrial unrest through which they had passed during recent years would diminish, and conditions improve for all concerned, by the spread of co-partnership such as their Company had adopted.

SULPHATE OF AMMONIA PRICES.

Nitram, Ltd., in the course of a circular letter, say:

"We give you below the prices at which we are prepared until further notice to book orders for sulphate of ammonia for home agricultural use during the present season. We reserve the right to raise our prices at any time by sending out a printed notice to that effect. Any such increase in price will apply to all orders received after the date of issue of the notice. There will be no allowance for taking delivery *ex* works. As practically no ordinary quality is likely to be available, we refrain from quoting a price for this quality. It is understood that quantities purchased at the price stated below will be used for home agricultural purposes only.

"We offer to sell sulphate of ammonia for home agricultural use at the following prices for delivery in:

1928.	£ s. d.	1929.	£ s. d.
August	10 0 0	January	10 11 0
September	10 0 0	February	10 13 0
October	10 2 0	March	10 13 0
November	10 5 0	April	10 13 0
December	10 8 0	May/June	10 13 0

per ton for neutral quality guaranteed to contain 20·60 p.ct. of nitrogen by weight, and not to contain more than 0·025 p.ct. of free acid (H_2SO_4), and to be in readily friable condition at the time of delivery, delivered to consumer's nearest station or wharf in Great Britain (or f.o.b. British port when the ultimate destination is Isle of Man) for prompt cash payment in lots of 6 tons and upwards, packed in single bags containing about 2 cwt. net, to be supplied free by sellers, tare allowed. When credit is given, a reasonable extra charge may be made, but the discount allowed for prompt payment should be quoted on the invoice. The above prices will also apply to deliveries of 1 ton and upwards *ex* works or *ex* store to buyers' road vehicle."

A statement of conditions follows.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Aug.* 3.

Further business in pitch is reported, and the price now appears to have reached a level that is interesting to buyers. Creosote is slightly easier. Current values are as follows:

Pitch is about 50s. per ton.
Creosote 7⅝d. to 7¾d. per gallon.
Pure benzole about 1s. 8d. per gallon.
Solvent naphtha, 95/160, is 1s. 5d. to 1s. 6d. per gallon.
Pure toluole is 1s. 11d. to 2s. per gallon.
Pyridine bases, about 5s. per gallon.

Tar Products in the Provinces.

Aug. 7.

The average prices of gas-works products during the week were: Gas-works tar, 33s. 6d. to 38s. 6d. Pitch—East Coast, 47s. 6d. to 50s. f.o.b. West Coast—Manchester, 41s. 6d. to 42s. 6d.; Liverpool, 43s. 6d. to 45s.; Clyde, 42s. 6d. to 45s. Toluole, naked, North, 1s. 5d. to 1s. 6d. nominal. Coal-tar crude naphtha, in bulk, North, 9d. to 10d. Solvent naphtha, naked, North, 1s. 1½d. to 1s. 2d. Heavy naphtha, North, 1s. to 1s. 0½d. Creosote, in bulk, North, liquid, 6d. to 6¼d.; salty, 5⅞d. to 6¼d.; Scotland, 5⅞d. to 6¼d. Heavy oils, in bulk, North, 8¼d. to 8½d. Carbolic acid, 60 p.ct., 2s. 2d. to 2s. 2½d. prompt. Naphthalene, £13 to £15; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Benzole Prices.

The following are considered to be the market prices to-day:

	s. d.	s. d.	
Crude benzole	0 10½	to 0 11	per gallon at works
Motor "	1 4½	" 1 5	" " "
90 p.ct. "	1 7	" 1 8	" " "
Pure "	1 10	" 1 11	" " "

An agreement between the Accrington District Gas Board and the Altham Colliery for a supply of gas from the pit-head, where a series of modern coke ovens is being constructed, will come into operation shortly. It was stated at a meeting of the Board on July 26 that the new scheme will mean the closing-down of the larger part of the Great Harwood Gas-Works.

TRADE NOTES.

Resetting Work at Retford.

The resetting of two beds each containing eight retorts 20 ft. long, for the Retford Gas Department, has been entrusted to Messrs. W. J. Jenkins & Co., Ltd., of Retford. The retorts were originally silica segmentals, but the resetting work abandons that type of retort in favour of fireclay.

Everything for Safety Everywhere.

Messrs. Siebe, Gorman, & Co., Ltd., of 187, Westminster Bridge Road, S.E. 1, have published a new catalogue of their safety and protective appliances, including oxygen breathing apparatus, gas masks, smoke helmets, dust and spray masks, and other breathing appliances for use in poisonous and noxious atmospheres.

Coke Oven Gas for Featherstone.—An important change has been effected by the Ackworth, Featherstone, Purston, and Sharleston Gas Company, Ltd. Hitherto the gas has been made in the usual manner by the Company's own plant, but the retorts are now to be closed down, and the gas obtained entirely from the coke ovens of the neighbouring colliery at Ackton Hall.

Royal Society for the Encouragement of Arts, Manufactures, and Commerce.—A selection of the designs received in the Competition of Industrial Designs, 1928, for prizes and scholarships offered by the Society, the Empire Marketing Board, and well-known manufacturers, will be exhibited, by permission of the Board of Governors, in the Exhibition Pavilion of the Imperial Institute, South Kensington, from Aug. 4 to Sept. 1 next, every week-day from 10 a.m. to 5 p.m. (Sundays 2.30 to 6 p.m.). The Exhibition is open free of charge; and no tickets are required.

Sales of Gas at Winchester.—The report of the Directors of the Winchester Water and Gas Company for the half-year ended June 30 states that the balance of net revenue available for dividend, after transferring £250 to the reserve fund account, is £10,679; and the Directors recommend the payment on Sept. 1 next of dividends on the preference stocks at the rates of 4 and 5½ p.ct. per annum respectively, less income-tax, and on the consolidated ordinary stock at the rate of 5 p.ct. per annum, less income-tax, for the half-year. The sale of gas during the half-year has increased by 5 million c.ft., or 5·3 p.ct. over the corresponding half-year of 1927. The price of gas was reduced at Lady Day; and the Directors hope to announce a further reduction as and from the Michaelmas meter reading.

Maidstone Gas Company.—The report of the Directors, which is to be presented at the ordinary yearly meeting of the Company, to be held to-morrow, states that the revenue account for the past year shows that, after providing for all fixed charges, including £3800 for depreciation of stoves and fittings, there remains an available balance of £16,963, which, together with the balance of £13,346 brought forward from the previous year, and £1050 earned on investments, makes a total of £31,360. After providing for income-tax, interest on debenture stock and deposits, and the interim divdend of 4 p.ct. paid on March 1 last, there remains a balance of £19,350, out of which the Directors recommend the payment of a final dividend of 4½ p.ct., making 8½ p.ct. for the year. The price of gas was reduced by 0·4d. per therm (from 9·6d. to 9·2d. per therm), this reduction dating from the readings of the meters for the December quarter, 1927. The sales of gas during the past year again show a satisfactory increase.

Blackburn and a Coal Purchase Committee.—At a meeting of the Blackburn Town Council on Aug. 2, Councillor Franklin introduced a motion for the appointment of a coal purchase committee for the whole Corporation. He urged that the scheme would result in a great saving in the course of a year. He suggested that neighbouring councils should act in unison, and buy their stocks together in the cheapest market. In the war, co-operative buying was tried with astonishing success. Without it trade would have been impossible. Blackburn Corporation spent £100,000 per year on coal alone. He suggested an impartial purchasing committee, so that undue influences would not be brought to bear. Other Councillors opposed the scheme on the ground that it was not practicable. Councillor Porter instanced the case of gas coal. What would suit the retorts of one authority would be quite useless to another, so that the area scheme would lead nowhere. Moreover, the Committee should consist of experienced men, and no one was better qualified for the work than the Chairman of the Gas Committee. In the end the resolution was referred to the General Purposes Committee for consideration.

The Directors of the Elie and Earlsferry Gas Company, Ltd., report a net profit on the year's working of £426. They recommend to transfer £250 to depreciation account.

The Tettenhall Urban District Council recently decided to renew the contract with the Wolverhampton Gas Company for the lighting of the street lamps during the coming season.

The Spenborough Urban District Council Gas Department were awarded the first prize for the best trades exhibit on a motor vehicle in the procession of the annual Spen Valley Carnival held at Cleckheaton recently.

At the annual meeting of the Montrose Gas Company, Ltd., it was agreed to make a payment of a final dividend of 5 p.ct., which, with the interim dividend of 5 p.ct. in January, makes a dividend of 10 p.ct. for the year.

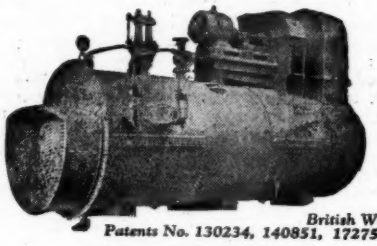
Tendering for street lighting on a three years' basis to the Cullompton Urban District Council, the Culm Valley Electric Supply Company quoted 36s. per lamp per annum, and the Cullompton Gas Company 31s. 6d. per lamp per annum. The Gas Company's tender was accepted.

"*regarded as standard.*"

KIRKE
PATENT WASTE HEAT
BOILERS

FOR

GLOVER-WEST VERTICAL RETORTS
ALL OTHER MAKES OF VERTICAL RETORTS · HORIZONTAL RETORTS
INCLINED RETORTS · WATER GAS PLANTS · CHAMBER OVENS and COKE QUENCHING PLANTS.



British Waste Heat Boiler
Patents No. 130234, 140851, 172752, 186801, etc.

HERE
is part of an edifying conversation heard recently.

Chief Engineer of a Gas Company enquiring of another as to the points of Kirke Patent Waste Heat Boilers:

"*Do you find the upkeep of these boilers expensive and do they pay?*"

Chief Engineer of Gas Company already using Kirke Waste Heat Boilers:

"*I put in two of them about three years ago and two more about two years ago. I haven't spent a sixpence on repairs and we have got back our capital 5 to 6 times over already.*"

The point is: Can you afford to ignore the existence of such a boiler? Why not let us instal them on your settings also?

SPENCER-BONECOURT
LIMITED
The Waste-Heat Recovery Specialists,
50-64 BROADWAY, WESTMINSTER, S.W.1
'Phone: VICTORIA 2802-3.
Telegraphic Address: "BONECOURT, SOWEST, LONDON."

0 6 8

STOCK MARKET REPORT.

In spite of the holiday exodus, the Stock Exchange was in an unusually confident mood last week. The general tone was firm, and there was marked activity in the Industrial section, the feature of which was the upward movement in Gramophone shares.

A fairly steady investment demand was also in evidence, and practically all the available stock was absorbed. The new City of Dublin loan was prominent, and rose to 1⅜ p.ct. premium on the issue price. Funding Loan was dull; but the 5 p.ct. War Loan improved to 102½. Colonial Corporations and Rails were in demand, but there were very few parcels on the market.

In the Gas Market confidence was the order of the day, business being quite up to expectation. No stocks were marked down. Among those that improved in value during the week were: Barnet ordinary, Chester ordinary, and Plymouth and Stonehouse 5 p.ct., all three of which were marked up 2 points. A material advance of 1s. was also made in the quotation of the Primitiva ordinary. Among the dividend announcements of the week were Newcastle and Gateshead 2½ p.ct. (interim) and Maidstone 4½ p.ct., equalling 8½ p.ct. for the year to June, both being at the same rates as for the corresponding period.

The following transactions were recorded during the week:

On Monday, Alliance and Dublin 96½, Commercial 97½, Gas Light and Coke 18s. 9d., 18s. 10½d., 19s., 4 p.ct. preference 76½, 78½, 3 p.ct. debenture 60¼, Primitiva 23s., 23s. 3d., 23s. 4½d., 23s. 6d., South Metropolitan 106, 6½ p.ct. debenture 101, Tottenham "B" 97, Wandsworth 3 p.ct. debenture 57¾. Supplementary prices, Aldershot 4 p.ct. debenture 72, Gas Light and Coke 5 p.ct. debenture 100½.

On Tuesday, Alliance and Dublin 95¾, Bombay 22s. 10½d., Bournemouth 4 p.ct. debenture 76½, Colombo 7 p.ct. preference 22s. 6d., Gas Light and Coke 18s. 9d., 18s. 10½d., 19s., 19s. 0⅛d., 19s. 1½d., 3 p.ct. debenture 60⅜, 61, Imperial Continental 168, 169, Primitiva 22s. 9d., 23s., 23s. 1½d., 23s. 3d., 23s. 6d., South Metropolitan 105¼, 106, South Suburban 5 p.ct. 105, 108, Uxbridge 5 p.ct. 94½. Supplementary prices, Gas Light and Coke 5 p.ct. debenture 100½, 100½, Great Yarmouth 8½ p.ct. maximum 30½, 30½, Liverpool 5 p.ct. 91.

On Wednesday, Barnet 7 p.ct. 112, 113, Bournemouth 6 p.ct. preference 11, 4 p.ct. debenture 76½, Commercial 98, Gas Light and Coke 18s. 10½d., 19s., 19s. 0⅛d., 19s. 1½d., 4 p.ct. preference 77½, 77¾, 78⅜, 3 p.ct. debenture 60¼, Hornsey 3½ p.ct. 84½, Imperial Continental 168½, 3½ p.ct. debenture 69½, 70, Primitiva 23s., 23s. 1½d., 23s. 4½d., 23s. 6d., South Metropolitan 105¼, 105½, 106, 3 p.ct debenture 59, South Suburban 5 p.ct. 107. Supplementary prices, Aldershot 4 p.ct. debenture 78, Croydon 4 p.ct. debenture 78½, Gas Light and Coke 5 p.ct. debenture 100½, Walton-on-Thames 6 p.ct. preference (new) 109.

On Thursday, Alliance and Dublin 95¼, Bournemouth 6 p.ct. preference 11½, 4 p.ct. debenture 78, Commercial 98, European 87⅞, Gas Light and Coke 18s. 10½d., 19s., 19s. 0⅛d., 19s. 1½d., 3 p.ct. debenture 60¼, Imperial Continental 168, Primitiva 23s. 6d., 23s. 7½d., 24s., South Metropolitan 105¼, 106, 6½ p.ct. debenture 101½. Supplementary prices, Aldershot 4 p.ct. debenture 75, Gas Light and Coke 5 p.ct. debenture 100½, Hornsey 4 p.ct. debenture 74, Newport 5 p.ct. debenture 85, Walton-on-Thames 6 p.ct. preference (new) 108½, 109.

On Friday, Alliance and Dublin 95, 95½, 96⅛, 96¼, Commercial 97, 98, 98½, Croydon 111, 111½, Gas Light and Coke 18s. 10½d., 18s. 11½d., 18s. 11½d., 3½ p.ct. 62½, 4 p.ct. preference 77½, 78¾, Imperial Continental 169½, Lea Bridge 5 p.ct. 96½, Primitiva 23s. 9d., 23s. 10½d. 24s., 24s. 3d., South Metropolitan 3 p.ct. debenture 59, South Suburban 107½, Tottenham "B" 97½. Supplementary prices, Gas Light and Coke 5 p.ct. debenture 100½, Metropolitan (of Melbourne) 9⅞, 5½ p.ct. debentures (issued at £100, £50 paid) 50.

Assisted doubtless by the disbursement of Government dividends, the usual week-end ease prevailed in Lombard Street. Money was plentiful throughout the day, and the charge for new money dropped from 3½ to 3 p.ct., the renewal rate being 3¼ p.ct. £40,000,000 Treasury Bills were offered, the average rate being £4 4s. 2·6d. p.ct., or just over 1s. 8d. p.ct. above the previous week's rate.

On the Foreign Exchange Market the dollar-sterling declined further, and closed at 4.85 7/16; the Paris rate, on the other hand, moved upward, and was quoted finally at 124.15½. Dutch florins were higher at 12.09 9/16; Italian lire lower at 92.77½; and Spanish pesetas slightly higher at 29.54.

Silver declined ⅛d. to 27½d. per oz., both India and China being sellers. Gold remained at the nominal price of 84s. 11½d. per oz.

The Bank Rate is 4½ p.ct., to which it was reduced from 5 p.ct. on April 21, 1927. The Banks' deposit rate is 2½ p.ct., and the deposit rates of the discount houses are 2½ p.ct. at call and 2⅝ p.ct. at notice.

Issue.	Share.	When ex-Dividend	Dividends. Prev. Hf. Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. Aug. 3.	Rise or Fall on Week.	Transactions Lowest and Highest Prices.
£			% p.a	% p.a.				
171,978	Stk.	Feb 9	5	5	Aldershot 5 p.c. max. C.	74—79	..	..
412,992	,,		4	4	Do. 4 p.c. Pref.	69—72	..	..
1,551,868	,,	Apl. 12	7	7	Alliance & Dublin Ord.	94—97	+1	95—96½
374,000	,,	July 12	4	4	Do. 4 p.c. Deb.	68—66	..	..
532,654	,,	Mar. 8	7	7	Barnet Ord. 7 p.c.	111—114	+2	112—113
900,000	1	Apl. 26	1/7½	1/7½	Bombay, Ltd.	21/—22/-	..	22/10½
170,000	10	Mar. 8	8½	8½	Bournemouth 5 p.c.	12½—13½	..	..
600,050	10	,,	7	7	Do. B 7 p.c.	12½—12⅝	..	..
375,000	10	,,	6	6	Do. Pref. 6 p.c.	11—11½	..	11—11½
50,000	Stk.	July 12	3	3	Do. 3 p.c. Deb.	56—59	..	..
162,035	,,	,,	4	4	Do. 4 p.c. Deb.	75—78	..	76½—78
357,900	,,	Mar. 8	7½	7½	Brighton & Hove 6 p.c. Con.	116—119	..	..
341,880	,,	,,	6/8/6‡	6‡	Do. 5 p.c. Con.	103—106	..	..
1,287,500	,,	July 26	5	5	Bristol 5 p.c. max.	89—90a*	..	..
855,000	,,	Mar. 22	8	7	British Ord.	113—116	..	..
100,000	,,	June 28	7	7	Do. 7 p.c. Pref.	111—114	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	73—76	..	..
200,000	,,	,,	5	5	Do. 5 p.c. Red. Deb.	94—97	..	..
100,000	10	May 24	6	8	Cape Town, Ltd.	7½—8½	..	..
100,000	10	Apl 26	4½	4½	Do. 4½ p.c. Pref.	6½—7½	..	..
150,000	Stk.	June 28	4½	4½	Do. 4½ p.c. Deb.	70—75	..	..
626,850	,,	July 26	6	6	Cardiff Con. Ord.	96—99*	..	..
237,860	,,	June 28	7½	7½	Do. 7½ p.c. Red. Deb	100—103	..	..
157,150	,,	Feb 23	5	6½	Chester 5 p.c. Ord.	90—95b	+2	..
79,186	1	Apl. 26	12/-	12/-	Colombo Ltd. Ord.	21/—22/-	..	..
24,495	1	,,	1/4‡	1/4‡	Do. 7 p.c. Pref.	20/—22/-	..	22/6
375,402	1	Apl. 12	1/92	1/9‡	Colonial Gas Assn. Ld. Ord.	23/—25/-	..	..
187,848	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	21/—23/-	..	..
2,073,280	Stk	July 26	7	5	Commercial Ord.	96—99*	..	97—98½
475,000	,,	June 14	8	8	Do 8 p.c. Deb.	57—60	..	..
800,000	,,	Sept. 29	11	11	Continental Union, Ltd.	33—36	..	..
200,000	,,	Mar. 8	7	7	Do. 7 p.c. Pref.	92—97	..	..
787,560	,,	Mar. 8	6½	7	Croydon sliding scale	110—113	..	111—111½
403,100	,,	,,	5	5	Do. max. div.	84—87	..	..
492,270	,,	Mar. 8	7	10	Derby Con.	115—130c	..	..
55,000	,,	June 28	4	4	Do. Deb.	71—73c	..	..
209,000	,,	Mar. 8	5	5	East Hull Ord. 5 p.c.	76—79	..	..
50,000	,,	June 28	5	5	Eastbourne 5 p.c. Deb.	91—96	..	..
1,003,180	10	Mar. 22	14	16	European, Ltd.	8—9	..	8½
18,703,480	Stk	July 26	f/1/1	5½	Gas Light & Coke 4 p.c. Ord.	18/9—19/3f*	..	19/0—19/1½
2,600,000	,,	,,	8½	8½	Do. 8½ p.c. max.	61½—63½*	..	62½
4,167,020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	77—80*	..	76½—78½
5,602,630	,,	June 14	8	8	Do. 8 p.c. Con. Deb.	60—62	..	60½—61
181,315	,,	,,	6	6	Do. 6 p.c. Br'tl'd Rd. Db.	103—106	..	..
1,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb.	99—101	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Mar. 8	6½	6½	Hastings & St L. 5 p.c. Conv	90—95	..	..
258,740	,,	,,	5½	5½	Do. 5½ p.c. Conv.	70—75	..	..
70,000	10	Apl. 26	†10	†10	Hongkong & China, Ltd.	13½—14½	..	..
173,200	Stk.	Mar. 8	5	5	Hornsey Con. 3½ p.c.	83—85	..	84½
1,976,000	,,	May 24	10	10	Imperial Continental Gas.	166—171	..	168—169½
223,130	,,	Feb. 9	3½	3½	Do. 3½ p.c. Red. Deb.	68—70	..	69½—70
335,342	,,	Mar. 8	7	7	Lea Bridge 5 p.c. Ord.	95—98	+1	96½
2,146,907	,,	Feb. 23	5½	5½	Liverpool 5 p.c. Ord.	92—98b	..	..
600,000	,,	Mar 22	7	7	Do. 7 p.c. Red. Pref.	103½—105½b	+1½	..
165,736	,,	Feb. 23	9	8	Maidstone 5 p.c. Cap.	115—120	..	..
75,000	5	June 14	18	18	Malta & Mediterranean	5½—5¾	..	..
641,920	Stk.	May 24	15	17	Montevideo, Ltd.	94½—96½	..	..
2,061,315	,,	Mar. 8	5	5	Newcastle & Gateshead Con.	16/3—17/-d/	..	..
350,929	,,	,,	4	4	Do. 4 p.c. Pref.	74½—75½d	..	..
691,705	,,	June 28	8½	8½	Do. 8½ p.c. Deb.	85—864	..	..
131,780	,,	Mar. 8	6/18/0	6/18/0	North Middlesex 6 p.c. Con.	98—101	..	..
800,000	,,	Apl. 26	9	7	Oriental, Ltd.	116—121	..	..
188,120	,,	June 28	7½	7½	Plym'th & Ston'house 5 p.c	107—112	+2	..
414,500	,,	Feb. 23	7½	7½	Portsm'th Con. Stk. 4 p.c. Std.	101—104	..	..
386,732	,,	,,	5	5	Do. 5 p.c. max	77—80	..	..
2,334,454	1	—	—	—	Primitiva Ord.	23/6—24/6	+1/-	22/9—24/3
244,500	100	June 1	4	4	Do. 4 p.c. Red. Deb.	91—94	..	..
695,000	Stk.	July 26	4	4	Do. 4 p.c. Red. Deb. 1911	76—78*	..	..
416,345	,,	June 28	4	4	Do. 4 p.c. Cons. Deb.	75—77	..	..
150,000	10	Mar. 22	8	8	San Paulo 6 p.c. Pref.	8⅜—8¾	..	..
370,000	Stk	Mar. 22	6	6	Sheffield A	103—105e	..	..
419,968	,,	,,	6	6	Do. B	103—105e	..	..
1,047,000	,,	,,	6	6	Do. C	103—105e	..	..
90,000	10	June 14	6	8	South African	4—6	..	..
6,809,895	Stk	July 26	7½	5	South Met. Ord.	104—106*	..	105½—106
500,000	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	108—111*	..	..
1,895,445	,,	July 12	3	3	Do. 3 p.c. Deb.	58—61	..	59
784,000	,,	Mar. 8	6½	6½	Do. 6½ p.c. Red. Db.	100—103	..	101—101½
91,500	,,	Feb. 23	8½	8½	South Shields Con.	110—112d	..	..
1,243,795	,,	July 26	6½	6½	South Suburban Ord. 5 p.c.	105—108*	+1	105—108
968,887	,,	June 28	5	5	Do. 5 p.c. Deb.	96—99	..	..
647,740	,,	Mar. 22	5	5	South'mpton Ord. 5 p.c. max.	78—80	..	..
121,275	,,	June 28	4	4	Do. 4 p.c. Deb.	72—75	..	..
350,000	,,	Mar. 8	7	7	Swansea 7 p.c. Red. Pref.	100—103	..	..
200,000	,,	June 28	6½	6½	Do. 6½ p.c. Red. Deb.	99—102	..	..
190,000	,,	July 26	7½	8	Tottenham District A 5 p.c.	116—121*	..	..
682,278	,,	,,	6½	6½	Do. B 5½ p.c.	95—98*	..	97—97½
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	96—99*	..	..
181,255	,,	June 14	4	4	Do. 4 p.c. Deb.	76—79	..	..
289,094	,,	Mar. 8	6½	6 5/16	Uxbridge, Maidenhead, & Wycombe 5 p.c.	90—95	..	94½
88,880	,,	,,	5	5	Do. 5 p.c. pref.	86—90	..	..
					Wandsworth, Wimbledon, and Epsom—			
80,000	,,	July 12	8½	8½	Wandsworth A 5 p.c.	126—129	..	..
255,636	,,	,,	7	7½	Do. B 8½ p.c.	108—113	..	..
432,585	,,	,,	5/19/0	6½	Do. C and New	96—101	..	..
362,000	,,	,,	6⅝	6⅝	Do. Wimbledon 5 p.c.	104—108	..	..
98,000	,,	,,	7⅛	7⅛	Do. Epsom 5 p.c.	110—115	..	..
200,000	,,	,,	5	5	Do. 5 p.c. Pref	85—88	..	..
88,416	,,	June 28	8	8	Do. 8 p.c. Deb.	56—59	..	57½
234,748	,,	,,	4	4	Do. 4 p.c. Deb.	75—78	..	..

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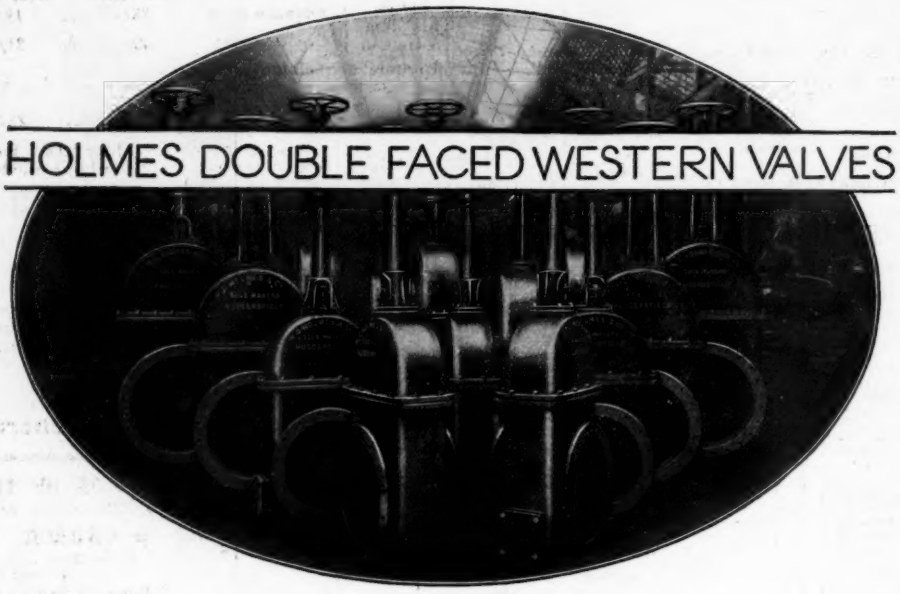

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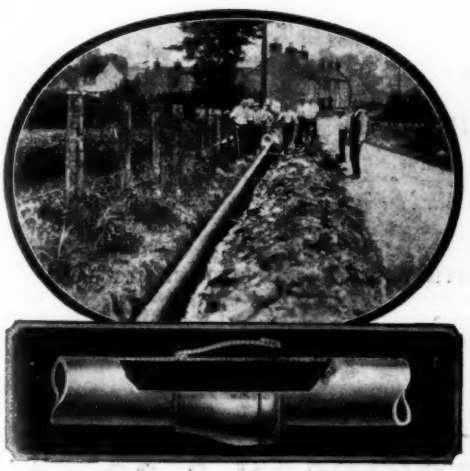

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